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SUMMARY REPORT

WESTERN COAL: PROBLEMS, PROGRESS AND PROMISES

An Engineering Foundation Conference

Keystone, Colorado
September 10-15, 1978

Conference Sponsors:
U. S. Department of the Interior
U. S. Department of Energy
Electric Power Research Institute

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A conference sponsored by the
ENGINEERING FOUNDATION

at Keystone, Colorado
September 10-15, 1978

Conference Chairman: P. Stanley Jacobsen,
Colorado School of Mines
Research Institute
Conference Co-chairman and Report Editor:
Albert G. Melcher, Colorado School
of Mines Research Institute

Conference Coordinator: Sandford S. Cole, Director,
Engineering Foundation Conferences

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U.S. Department of the Interior, Bureau of
Land Management
U.S. Department of Energy
Electric Power Research Institute

PREFACE

This Report was prepared to summarize the proceedings of the Conference. The editor has endeavored to provide accurate summaries of the statements made at the Conference. However, this Report is not a direct transcript. It does not necessarily represent the policies or opinions of the Engineering Foundation, the funding organizations, or the Colorado School of Mines Research Institute. Further, the statements and opinions expressed by speakers at the Conference are strictly their own, and do not necessarily represent official viewpoints of their organizations or of the funding organizations.

The format of this Summary Report follows that of the Conference itself. It is organized by conference session and each speech within the session, in sequence.

The sincere appreciation of Engineering Foundation Conferences, the Conference Chairman, and the Conference Co-chairman is expressed to the organizations that provided funds for the Conference, including this Summary Report:

U.S. Department of the Interior, Bureau of Land Management

U.S. Department of Energy

Electric Power Research Institute

Finally, our appreciation is extended to each Session Chairman and Speaker.

P. Stanley Jacobsen
Conference Chairman

Albert G. Melcher
Conference Co-chairman and
Summary Report Editor

The grants to CSMRI for the publication of this Report provided for a limited number of copies. Additional copies are available from CSMRI for $7.00 per copy.

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INTRODUCTION TO SUMMARY REPORT

P. Stanley Jacobsen, CSMRI
Conference Chairman

The Engineering Foundation Conference on "Western Coal: Problems, Progress, and Promises", focused attention on the significant issues effecting the development and usage of the region's vast reserves of coal. It appeared that the main issues centered around the lack of a National energy policy, the problems associated with the Federal coal leasing program, and the regulations promulgated by the Office of Surface Mining.

The transportation of western coal was the subject of a lively session involving the railroad interests on one side and the interests of pipeline enthusiasts on the other.

Technical issues were not neglected but were given coverage in the following areas: emerging mining technologies, preparation, utilization options, combustion research, and particulate/SOx emissions at the power station.

WELCOMING REMARKS:

Sandford S. Cole, Director, Engineering Foundation Conferences, extended a welcome to all participants. The Engineering Foundation Conferences were initiated in 1962 to promote discussions of new knowledge in the engineering fields and to develop an interface with other sciences. The conference format promotes discussions and enhances rapport among participants. The program provides morning and evening sessions in which major presentations are made, but time is available during the afternoons for ad hoc meetings or for informal discussions on the developments of the meeting. The Engineering Foundation Conferences have been instrumental in generating ideas and disseminating information to a greater extent than is possible through most conventional presentations or publications. It is hoped that the problem definitions and need statements which emanate from the conferences will extend the frontiers of science and engineering to the benefit of mankind.

P. Stanley Jacobsen, Colorado School of Mines Research Institute, Conference Chairman, discussed the goals and purposes of the Conference, which were to examine the status and future of Western coal from both technical and policy-related viewpoints.

SESSION I

WESTERN COAL DEVELOPMENT:

AN OVERVIEW

Session Chairman: James C. Wilson,
President, Rocky Mountain
Energy Company

Session I was devoted to a panel on "The Western Dimensions of National Coal Development--Goals, Policies, and Programs from Both the Federal and State Viewpoint".

Mr. Wilson's preamble to this session indicated the major issues as he views them: air quality control and mandatory scrubber requirements; water and whether it is managed in Washington or in the West; transportation of coal; socio-economic factors, and the East-West aspect of coal development. He cited a recent study on coal which observed that regionalism has triumphed over national interests, environmentalism has gone berserk, new technology has been frustrated, and conflict has prevented progress.

The Honorable James A. Joseph, Undersecretary of the Interior

Undersecretary Joseph focused on three interrelated subjects:

1. Coal production goals and the relationship between the Department of the Interior (DOI) and the Department of Energy (DOE).
2. Federal coal leasing.
3. The Surface Mining Control and Reclamation Act.

The DOI philosophy of this Administration differs from that of previous administrations, but Undersecretary Joseph does not believe that the DOI commitment to environmental quality precludes meeting coal production goals. He feels that the Carter Administration has resolved some long-standing controversies so that coal production will proceed more smoothly.

Coal production goals involving Federal coal will not exist in a vacuum, as Federal coal is only a part of the nation's coal, which in turn is only part of the nation's energy supply. DOE has the major responsibility for overall energy policy, but DOI is the steward of Federal coal and is responsible for leasing. The major area of mutual concern between the two agencies is in establishing production goals. The agencies are developing a Memorandum of Understanding on their roles.

In developing a new leasing program, the Secretary of the Interior has rejected the "no leasing" option because existing leased coal is not adequate to meet the nation's needs. DOI will probably issue more leases in the next two years than it has in the past seven. As a result of the negotiations in the settlement of the "NRDC vs Hughes" lawsuit, DOI may issue as many as 35 leases containing between 250 and 300 million tons of coal, leading to an increase in annual production of 13 to 17 million tons. Interior can issue certain leases on a hardship basis, for bypass purposes, to avert mine closings and enable mines to meet existing contracts, and to allow some preference right lease applications to proceed.

By next spring, DOI intends to make decisions on a permanent leasing program. A Draft Programmatic Environmental Impact Statement is being written. DOI intends full compliance

with the National Environmental Policy Act; perfunctory compliance will not benefit industry.

Regarding the new regulations of the Office of Surface Mining, Undersecretary Joseph admitted that they are long and complex. He asked for industry and public help in streamlining them. They must be tailored to regions. He believes that full public participation will reduce delays in the long run. He noted that the Western coal industry should have less difficulty in meeting surface mining regulatory requirements due to their excellent experience in developing good mining and reclamation plans.

Undersecretary Joseph wants to have an honest and open dialogue with the Western coal industry, and he welcomes visits to his office by industry. Undersecretary Joseph stated that the OSM regulations must be specific and detailed so that they will stand up under challenges in court, but he asked for ideas for reducing their bulk and complexity.

The Honorable Ed Herschler, Governor,
State of Wyoming

Governor Herschler opened his comments with the observation that industrial development in Wyoming must be on Wyoming's terms. He noted that the Federal Government owns 48 percent of Wyoming's surface and 70 percent of the coal in the State. He believes that Secretary of the Interior Andrus understands the problem of the Western governors.

The thrust of Governor Herschler's remarks dealt with the progress which Wyoming has made in dealing with the problems associated with coal development. Several years ago, the State was unprepared for development. Now, the State has a number of tools available to ensure that development is orderly and that impacts are controlled or mitigated.

The Industrial Siting Act, land use planning with local implementation, cooperative state-federal agreements, and assistance to local communities from the Department of Economic Development and Planning are all important in dealing with development. The Wyoming Community Development Act will make $53 million available in revenue bonds for local housing development. The Farm Loan Board can make joint city-county loans, using funds available from mineral royalties. The State and three railroads will share costs of overpasses and safety improvements to mitigate coal transportation impacts.

Governor Herschler does not wish to endorse slurry pipelines until more is known about the Madison Formation aquifer and its recharge.

Governor Herschler stated that Washington does not understand the Western problem. He criticized the RARE II study progress as being too slow.

Wyoming wants industry but it wants to protect its land, air and water as it develops. Governor Herschler noted that the "rape and scrape" industries are a small minority, and he pointed out one very important benefit of development: the lowest unemployment rate in the nation, at 2.8 percent.

The Honorable Scott Matheson, Governor,
State of Utah

After complimenting the Department of the Interior on developing cooperative federal-state agreements, Governor Matheson enumerated the three main issues from his viewpoint:

1. Air quality and plant siting;
2. Leasing;

3. Wilderness, which is important because 66 percent of Utah is in Federal land ownership.

Governor Matheson focussed his speech on land use planning, which has been given a new significance as a result of Federal legislation of the last several years, and which is the keystone of Utah's programs to develop its resources wisely and to mitigate adverse impacts.

The Forest Lands Management Act and the Federal Land Policy and Management Act both require Federal agencies (Forest Service and BLM) to develop land use plans compatible with State and local plans. Governor Matheson emphasized the need for decentralized Federal planning, with sign-offs at regional, not Washington level, by DOI. BLM and the states must work jointly in such matters as designation of lands unsuitable for mining.

The most important Federal land use planning legislation is the Clean Air Act Amendments of 1977; Governor Matheson fears that Congress may rush to classify more areas as Class I "prevention of significant deterioration" (PSD) areas. Coal leasing is another form of land use planning; Governor Matheson is optimistic that DOI will establish a legitimate and workable leasing program. He stated that more coal leasing is needed because of environmental reasons, checkerboard problems, creation of logical mining units, coal availability to local utilities at low transportation costs, and to help reduce soaring electrical prices. The leasing program should emphasize land use planning, and states should nominate lands to be leased, he stated. Leasing should have lease exchanges for equivalent coal reserves; DOI should be authorized to purchase lease rights with cash and to exchange lands.

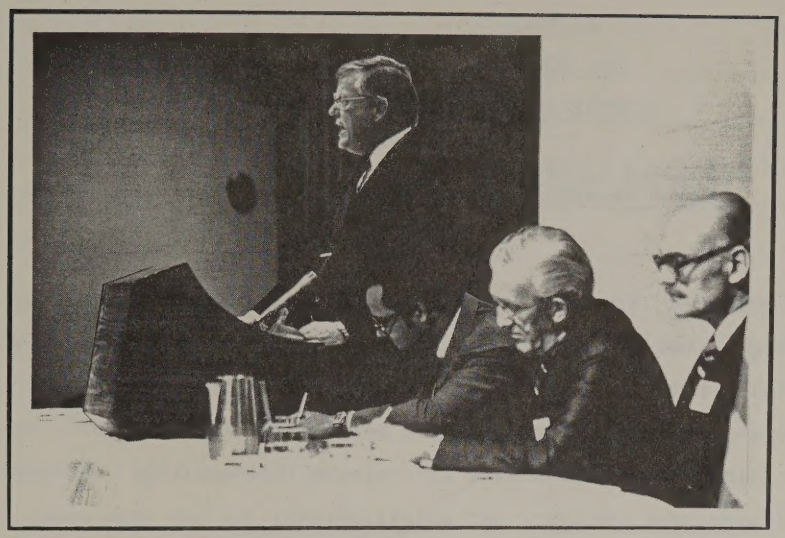
Withdrawals under RARE II for wilderness and recreation will increase conflicts in coal development and good land use planning.

The present wilderness review is not adequately coordinated between the various Federal agencies. Governor Matheson believes that the present wilderness study system is making it very difficult, if not impossible, for the State to conduct good land use and resource planning. The Administration and Congress must move rapidly to designate areas as Wilderness or to return them to multiple use.

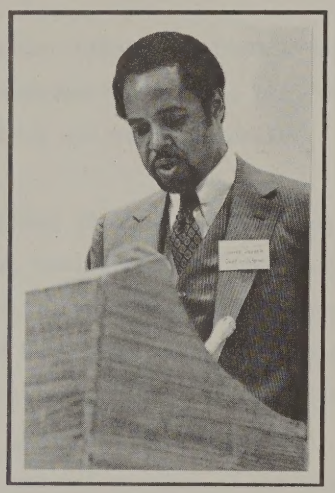
Questions, Answers and Dialogue in Session I

Governor Herschler believes that states should have veto power over proposed Federal leases. Undersecretary Joseph cannot support this because of the national responsibilities of DOI. He also stated that DOI presently has no policy for water needed for energy development.

Governor Herschler does not feel that there is great competition between the East and the West over Western coal development, as has been epitomized by the law and regulations on scrubber requirements. Governor Matheson does not support mandatory use of scrubbers when coal is low in sulfur content. Mr. Wilson stated that the problem in this matter lies with environmentalists who are using indirect tools (such as scrubbers and air quality) to accomplish other goals.

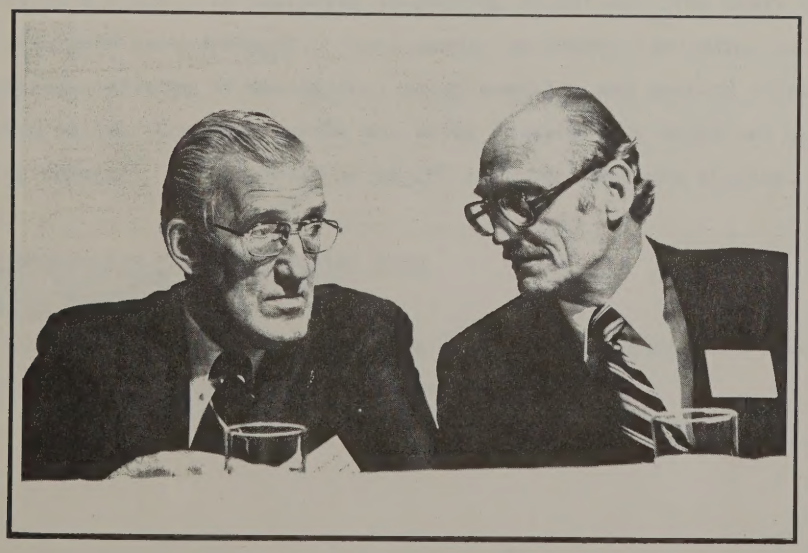


James C. Wilson, President, Rocky Mountain Energy Co., introducing The Honorable James A. Joseph, Undersecretary of the Interior, Governor Ed Herschler, Wyoming, and Governor Scott Matheson, Utah.



The Honorable James A. Joseph, Undersecretary of the Interior.

Governor Ed Herschler, Wyoming, (on left), and Governor Scott Matheson, Utah.



SESSION II

PRODUCTION AND

ENVIRONMENTAL EFFECTS

Session Chairman: David Nunenkamp,
Northern Energy Resources Company

Mr. Nunenkamp introduced this session with a brief description of four topics of interest and importance in bringing Western coal into production more rapidly. The U.S. Geological Survey's programs are essential in developing coal information for public and governmental purposes. The complexities of mine planning can be aided by the use of new tools involving the computer. Environmental studies are essential for developing the proper data base, for impact assessment and for reestablishing the premining environment. Mining in alluvial valleys, and the pertinent OSM regulations, may be a very difficult issue.

"USGS Mapping and Other Studies";
Robert Evans, Assistant Director, Central Region
U.S. Geological Survey

Three major laws of recent years have had significant effects on USGS's role in coal development. These are the Federal Coal Leasing Act Amendments of 1975, the Federal Land Policy and Management Act, and the Surface Mining Control and Reclamation Act. These have generated changes in direction and new programs.

The Regional Coal Assessment Program includes mapping at a 1:100,000 scale of geological factors (surficial, bedrock and environmental geology), coal resources (quantity and quality), geologic hazards, and regional geochemistry (soil, rock, stream sediment and vegetation). At a more detailed level, the Coal Resource Occurence and Coal Development Potential mapping program will provide open file maps on seams, mining ratios, total resources (assuming a 90 percent recovery factor in surface mining), and other quantitative information.

Support activities include topographic base maps and information on surface water quantity, quality and sediment, groundwater quantity and quality, and derivative maps of land use and land status. The water resource studies have, as one objective, the determination of physical availability. Some 600,000 acre-feet per year may be needed for energy development in the Northern Great Plains region. Ground water, such as that in the Madison Formation being studied by U.S.G.S., is receiving increasing attention. The basic thrust of the USGS studies is "protective geohydrology". For example, aquifers, including coal seams, must be assessed to determine effects of dewatering, water quantity and quality after mining, and effects on existing wells. Computer models are being developed to model and predict streamflow and water quality changes. These should be useful in urban land use studies.

"Computerization of Mine Planning from
Drill Hole Data"; Steven Nau,
Energy Fuels Company

The use of the computer can be valuable in developing mine planning information. Mr. Nau described the approach utilized by Energy Fuels.

The primary inputs are geological data from drill holes. The logs were redesigned to record data in a format suitable for input into the computer. The outputs include borehole reports, with computations of some data such as seam thickness, statistical reports and special summaries of data, and graphs such as maps of drillholes and drillhole data.

The graphs include isopachs of coal seam tops. These are valuable in assisting geologists in testing hypotheses such as the presence of faults. Profiles, cross-sections, three-dimensional plots and gradient plots are graphically generated. They enable the geologist to analyze and prove or disprove his preliminary findings, and they identify "red flags".

Volumetric calculations are generated. Alternative mine layouts can be quickly explored; only three to four hours are required per alternative compared to days or weeks if manual methods are used. Mine function models (such as ventilation) and economic analyses are done by the computer.

There are a number of problems which should be anticipated, and Mr. Nau provided a lucid summary of these. There may be resistance and politics within a company. Logistics can be difficult: the user and computer are remote to each other; a digitizer table is needed, and turnaround times may pose problems. It may be difficult to obtain usable data due to a lack of centralized in-house data, different x-y coordinate systems, and so forth. Decisions must be made on in-house versus out-of-house software and on hardware configuration questions such as timesharing and location. There may be wasted resources such as inefficient software, excessive data storage, useless or underutilized programs which occur because of the propensity of some people to create programs for their interest rather than that of the user. Finally, a company's computer resources may become overextended if care is not exercised.

"Environmental Base-Line Study":
William W. Schivley, Gilbert/Commonwealth

As the maze of permits and regulatory requirements grows more complex, coal operators are beginning to realize that many options are available to assist them through the environmental study process. First and foremost, today's western mine operators understand that mining beyond the 100th meridian is a highly scrutinized effort, in terms of both premining environmental evaluation and operational and postmining reclamation activities. In this respect, the selected avenue from which to proceed through the premining environmental process presents more hardline decisions for management. Probably the most important decision, and also the most controversial, is the level of detail required for environmental study.

At face value, this appears to be a straightforward judgment: regulatory agencies must be satisfied and mining permits secured. Although a prime objective, the regulatory permits requirement is only a small part of the environmental study process. Another factor which must be considered in the formulation of a study program is the inhouse information needs of the operator with respect to such items as physiographic data, cultural features, and ecological parameters. An additional item for consideration, and the most difficult to address, is the provision within the study program which accounts for changes in legislation, regulations and technology which will occur both during the initial environmental studies and while the mine site is under construction.

To best determine the most appropriate level of detail, the following factors must be considered:

1. total understanding of the minimum regulatory requirements which must be met;
2. thorough knowledge of in-house site specific information and its availability;
3. awareness of available out-of-house data.

An example was presented by Mr. Schivley, illustrated by a typical project flow chart and involving the environmental study factors of:

Air Quality
Hydrology/Water Quality
Soils
Wildlife
Vegetation
Aquatic Biota
Socioeconomics
Aesthetics/Land Use
Geology
Cultural Resources

The level of detail is not the only item considered when expanding these already demanding environmental parameters. For instance, some operators have chosen to correlate several of these detailed environmental parameters into an intricate correlation of study. One particular trend of combination studies is the soils/vegetation/wildlife association studies. Understanding interrelationships between sensitive ecological parameters will allow operators to better structure reclamation programs, which should result in more successful reclamation programs and earlier bond release.

Two items seem to be extremely controversial with respect to the level of detail required. Both socioeconomics and cultural resources are hotly disputed items which seem to fluctuate state by state and, sometimes, from site to site. In these instances, the operator has the opportunity when formulating an environmental study program to anticipate future regulatory additions.

Timing is critical to the value of an environmental study program. Accordingly, every effort should be made to begin the formulation of the study program and subsequent investigations as soon as a corporate decision has been made to mine a site. Using a conservative figure, with only minimum environmental studies being conducted, a two-year lead time is probable.

Agency coordination is of prime importance. All lead reviewing and commenting agencies should be notified in advance and during all critical phases of study. Liaison of this nature should not be viewed as the opening of one's operation to the scrutiny of regulatory agencies, but rather a sharing of mutually beneficial data. By utilizing this type of coordination, the operator is kept up to date as to state-of-the-art changes, and acceptable levels of detail. Conferring with agencies also establishes a positive framework for the eventual review and processing of a permit application. Probably the best rationale for this "sharing" is that no one is surprised at the end of the study, which should expedite and assure regulatory concurrence with the proposed operation.

Western coal operators have made amazing progress in developing our vast Western reserves. This is a significant accomplishment in light of the "moving target" syndrome, created by constantly changing rules and regulations, lawsuits and leasing difficulties.

One area which has contributed to this level of success has been the farsighted and realistic management approach coal operators have taken toward the development of environmental study programs. More and more companies are beginning to exercise every option available to streamline and expedite the regulatory process. The items offered in this presentation are by no means a state-of-the-art for developing and working through the environmental process, but rather are an attempt to stimulate new thoughts on this constantly changing subject matter. Industry must continue to get involved in all aspects of environmental study and assume the lead in pointing direction and identifying state-of-the-art conditions, not only for mining but for environental operations as well. Hopefully, this philosophy will enable industry to better control the shape of their own destiny, and ultimately keep the industry in the coal fields and out of the courts.

"Ground Water Studies Dealing with Alluvial Valley Floors in Surface Coal Mining": John B. Ivey, Amuedo and Ivey

Alluvial Valley Floors (AVF's) are of concern in the semiarid and arid areas of the United States west of the 100th meridian. Government interest centers on preserving the "essential hydrologic" functions of alluvial valleys, primarily for the benefit of agriculture. The surface coal miner should be concerned also, but for different reasons. "Alluvial valley floors" means the unconsolidated stream laid deposits holding streams where water availability is sufficient for subirrigation or flood irrigation agricultural activities but does not include upland areas which are generally overlain by a thin veneer of colluvial deposits composed chiefly of debris from sheet erosion, deposits by unconcentrated runoff or slope wash, together with talus, other mass movement accumulation and wind-blown deposits.

The farmer-rancher who needs the alluvial valley to raise grain and feed for cattle obviously uses the water which concentrates in the alluvial valley, both in the form of surface runoff and as ground water. The miner is concerned with the water in alluvial valleys largely as a matter of waste. When a mining operation cuts into alluvium, there is strong possibility that this material will contain water which must be intercepted before it reaches the pit, or if this is impractical, it must be removed from the pit at a cost to the mining operation, and with possible adverse environmental effects. Hence, the determination of hydrologic conditions in alluvial valleys prior to the commencement of mining operations should benefit both interests.

The study of alluvial valley floors is only one part of a broad hydrologic program required by OSM regulations. Although everyone in industry feels over-regulated, and with good reason, the law is a fact. The regulations are approaching finalization; and the guidelines discussed in this presentation are "suggested" and subject to modification.

The basic intent of the regulations is to assure the essential hydrologic functions of the alluvial valley floor in a five-part role which this geomorphic entity plays:

1. collecting water;
2. storing water;
3. regulating the natural flow of surface water;
4. regulating the natural flow of ground water;
5. making water available for agricultural activities.

An important aspect of the current regulations (and of the recently published guidelines) is the determination of what is arid and semi-arid. Various Federal agencies use the arid and semi-arid terminology, but there is no standard definition or method used to determine these conditions.

The statutory rationale underlying the determination of alluvial valley floors is to require surface coal mining and reclamation operations to:

> "Minimize the disturbances to the prevailing hydrologic balance at the mine-site and in associated offsite areas and to the quantity and quality of water in surface and ground water systems both during and after surface coal mining operations and during reclamation by--- preserving throughout the mining and reclamation process the essential hydrologic functions of alluvial valley floors---."

The guidelines establish a three-part approach in the determination of alluvial valley floors:

Part I - Reconnaissance evaluation to determine potential alluvial valley floors.

Part II - Further study of probable AVF's.

Part III- Detailed study of AVF and the surrounding area - identifying essential hydrologic functions and important supporting characteristics.

The third part, or detailed examination of the AVF's is time-consuming and rather exhaustive. Much of it can be accomplished in conjunction with other required hydrologic studies assuming a little advanced planning. The end result of Part III could be the approval or denial of a mining plan in terms of alluvial valley floors.

Mr. Ivey presented a lucid set of diagrams describing the components of alluvial valley floors. He described the mapping and photogeological program, including field review needed in the Part I study.

There is strong justification in this reconnaissance part of the AVF investigations to prepare a geologic map showing not only the geomorphic relationships (i.e., terraces, alluvial plain, channel), but the bedrock stratigraphy and structure, and all other hydrographic features including springs, seeps, natural and manmade ponds, etc. This information should be available in the first part, and not the last part of the study since it may well shorten the total study time.

The second phase of the Part I reconnaissance investigation concerns water availability characteristics. Water availability is to be determined in the physical sense, and not in the legal sense.

The guidelines state four procedures to determine water availability characteristics:

1. flood irrigation or special management activities;
2. extrapolation of irrigable land using surficial geologic characteristics;
3. flood irrigation capability; map all areas capable of being flood irrigated;
4. vegetation characteristics which may indicate subirrigation or flood innundation.

It should be noted as to the time requirements for AVF's that this activity probably will require a separate set of aerial photographs:

> "---color infrared photos should be taken toward the end of the growing season, especially at the time when upland growth has gone dormant, but not after the first killing frost on the valley floor. Photos should permit accurate mapping at a scale of 1:25000 or larger."

This is not impossible to do, but in the Western U.S. acquiring photography in the period between the time the "upland growth has gone dormant" and the "first killing frost" may be difficult during this very "iffy" part of the weather year.

Part II of the AVF study process deals with the final determination of the presence of an AVF.

In this part of the studies, certain aspects of the work require more detailed investigation, and it will be necessary to gather more quantitive data than will have been obtained in the Part I reconnaissance study. A portion of the information needed will have been collected in Part I. An additional effort is suggested in the guidelines to include an analysis of lithologic logs developed from coring or geophysical logging, if available. Logs of backhoe pits, and logs of observation wells, both provided for in the water availability studies of Part II are to be incorporated in the development of geomorphic criteria.

In Part II it will have been determined if an alluvial valley floor is present. Part III studies will proceed only if an AVF has been identified. The required study will determine the characteristics which support the essential hydrologic functions of the alluvial valley floor which has been identified.

The plot really thickens in this third part of the AVF studies. It is at this point the permit applicant must "bring it all together" and show the hydrologic relationship between alluvial valley floors and the bedrock aquifers. The effect of mining on the surface and subsurface must be projected.

Part III of the AVF consists of six elements or specifications for investigations:

1. surface hydrologic data;
2. geohydrologic data;
3. geologic data;
4. soils data;
5. vegetation data;
6. land use data.

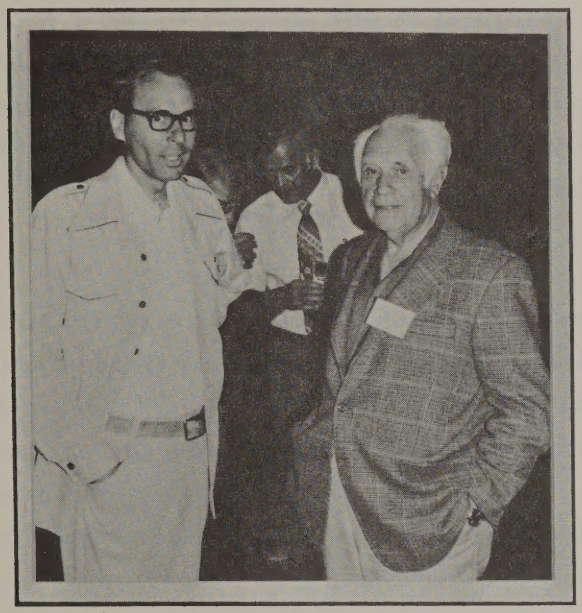
Mr. Ivey presented a "worst case" bar graph presentation of what the timing of an AVF study could be. There can be much variation depending on how the AVF study is coordinated with the other hydrologic studies which are required, and on the response times from OSM reviews. Taking into account possible acquisition of new aerial photography, (Part I), baseline monitoring, (Part II), and extensive quantitative data acquisition and assimilation, (Part III), it could take as much as 54 months, if everything goes wrong. Mr. Ivey does not believe that this will usually be the case, although it might well happen. At this time, he feels that it would be best to assume that OSM will require strict adherence to regulations.

Mr. Ivey discussed more in the way of <u>problems</u> than solutions because the solution to each AVF problem will, within certain guidelines, be an individual matter. As to <u>progress</u>, Mr. Ivey knows as a scientist that the studies can be accomplished. He cannot state with the same certainty that the cost of the studies will yield a commensurate benefit to the miner and to the farmer-rancher.

As to the <u>promise</u> - what does the future hold? We are an overregulated society now and prospect of reducing regulatory control does not appear imminent.

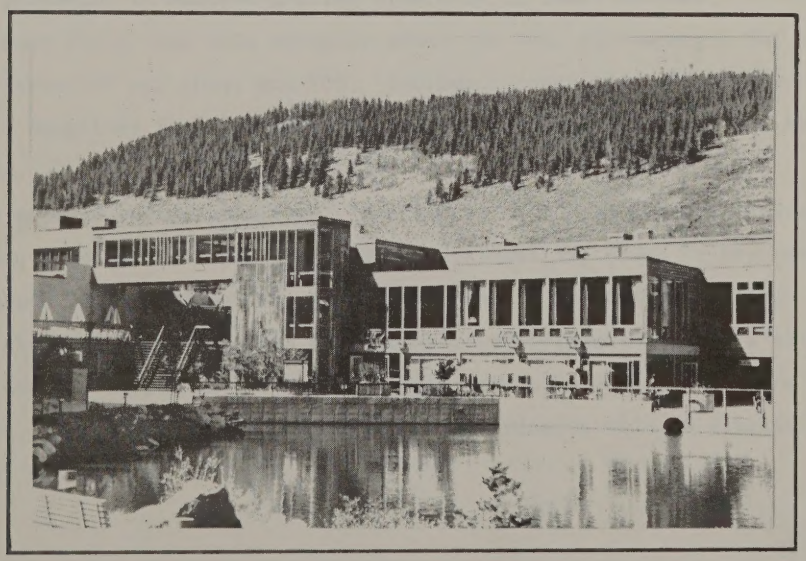
The regulations are a fact of life. The manner in which these regulations are enforced depends on the experience and background of the regulators. If the government will assign knowledgeable, experienced people to regulate the activities of the surface coal mine operations, the promise of the future will be as good as can be hoped for under a given set of conditions. Hopefully, in the enforcement of regulations, all levels of authority will recognize that zeal is no substitute for practicality.

As an example of this, Mr. Ivey noted that the final interim regulations mandate that alluvial valley floors exist in areas reported on by Malde and Boyle, by Schmidt, and by Hardaway, et. al. Yet Hardaway recognized that these studies were "reconnaissance reviews". The important thing to consider is that two studies, which were classified as reconnaissance by a recognized authority on alluvial valley floors, have been raised by regulations from the reconnaissance level to that of gospel.



P. Stanley Jacobsen, CSMRI, Conference Chairman, and Sandford S. Cole, Engineering Foundation Conferences, Conference Coordinator

Keystone Lodge and Conference Center



SESSION III

PRODUCTION

Session Chairman: William B. Schmidt,
U.S. Department of Energy

Mr. Schmidt opened this session with the observation that if coal is not Produced, there are no Problems, Progress or Promises.

"Supply and Demand": Frank Natta,
Utah International, Inc.

Eight Western states contain 217 billion tons of coal; 93.5 billion tons are surface mineable and 123.5 billion tons are mineable by underground methods. Seventy-six percent of this has a sulfur content below one percent. Production from these states was 40.5 million tons in 1971 and 146.6 million tons in 1977.

Federal estimates project a production capacity of 620.9 million tons in 1985. However, will market demands limit production to less than this projection?

Mr. Natta's estimates of demands for 1985 are:

Utilities: West	321.2 million tons
Utilities: East	63.6 " "
Metallurgical	10.8 " "
Industrial	22.0 " "
TOTAL	417.6 million tons

This indicates a potential oversupply which should be considered as an untapped potential. The reduced market growth is due in part to a slower electrical growth rate (4.5 percent) than that previously forecast (7 percent). Also, previous estimates had included 100 million tons per year for coal gasification; there will be slippage in this production due to the increasing estimated cost of syngas.

New markets will probably develop. For example, several utilities are planning a cogeneration plant near Houston, Texas, which will use 4 million tons per year. Reserves of metallurgical coal in the West are 18 billion tons, of which 2.7 billion tons are premium quality. An overseas market of one to two million tons per year may develop for this coal. Western steam coal is economically marginal in overseas markets, due to transportation costs and limited port capacity on the West Coast. The Japanese may purchase one to two million tons per year of steam coal, primarily to achieve greater diversity in their sources.

Prices for Powder River Basin coal rose abruptly after the OPEC oil embargo, but have subsequently declined to about $7 per short ton FOB. Equipment costs have risen dramatically; for example 55 cubic yard draglines have increased 20 percent per year in price, and now cost four times the 1971 price.

Severance taxes are major economic penalties. Montana, with its 30 percent severance tax, makes more money than does the coal producer. When royalties are added to severance taxes, the total governmental tax is 41 percent in Montana, and 28 percent in Wyoming.

Mr. Natta believes that the newly-proposed EPA scrubber requirements will be a slightly larger cost penalty for Eastern coal than for Western coal, due to more scrubber waste to be handled with Eastern coal. The overall impact of the EPA requirements will be slightly negative for Western coal production.

"Regional Planning Requirements":
Thomas Throne, Powder River Basin Resources Council

The Powder River Basin Resources Council, a citizen's organization, was founded in 1973 in response to the North Central Power Study. It started with 50 members, and now has 600 members. The Council assumes that there will be development, and its primary concern is to minimize environmental and social impacts and to maximize the benefits to Wyoming.

A basic philosophy of the Council is to try to get companies to assume the front-end costs of community development; these should not be thrust upon existing residents as new taxes. The Council believes that a profit-making company should have to consider all costs to decide whether an operation is profitable. Historically, taxes increase as development occurs, and do not drop later. Hence, existing residents bear the burden of development.

In environmental matters, the Council is intent on keeping the environmental consultants honest. It desires to minimize water development, and does not subscribe to the "use it or lose it" philosophy. The Council would prefer a "strip-and-ship" approach to coal development rather than the boom-bust conditions associated with the construction labor force of major power plants.

Mr. Throne stated that the Council does not condone harassment of coal operators. He stated a belief that no further coal leasing is needed, despite the lack of logical mining units in existing leases. He favors an exchange program on leases involving alluvial valleys and environmentally sensitive lands. A slurry pipeline would be preferable to mine-mouth power generation, partially because the latter would have higher water consumption.

"Impact of OSM Regulations":
George Robinson, Peabody Coal, Western Division

Mr. Robinson prefaced his presentation with the observation that the coal industry is Federally regulated to the point that it may never function efficiently again. There are too many unnecessary regulations which are not of benefit to the people of the U.S.

The Office of Surface Mining commenced with delays in issuance of its first regulations, and there was a lack of rationality in these. When industry sought changes, new sediment regulations (February, 1978) were no more rational than the first set.

Problems with the Surface Mining Control and Reclamation Act (SMCRA) will confront industry due to:

Judicial interpretations;
Regulatory interpretations;
Federal regulatory inflexibility;
State regulatory inflexibility;
Poor design criteria;
Interagency procedural problems.

OSM is challenging the constituted authorities which deal with:

State water law;
State water discharge permits;
State clean air regulation;
State land use policy;
State coal leasing.

As a typical problem, Mr. Robinson noted that OSM's proposed water quality standards for manganese were not upheld in court because they superceded EPA's standards. However, Montana and Wyoming retained the manganese standard, as well as Federal sediment design criteria which were deleted in OSM regulations.

Alluvial Valley Floor regulations may prevent the establishment of logical mining units, and may prevent mining in many places. AVF buffer zones suggested by OSM could be as much as 520 feet, which will be very costly and, according to Mr. Robinson, is irrational. Some AVF criteria are highly arbitrary. AVF studies may cost as much as $1 million per mine.

OSM may:

1. cause unnecessary delays in obtaining permits;
2. cause unnecessary delays in leasing;
3. cause unnecessary delays by not clarifying agency roles;
4. cause unnecessary delays in regional and site-specific Environmental Impact Statements;
5. cause production reductions;
6. cause litigation;
7. create administrative delays;
8. reduce coal reserves due to regulatory decisions on AVF's, unsuitable lands, etc.

A Peabody Coal study in Indiana calculated the cost of OSM regulations to be $3.00 per ton of coal; this does not include costs due to Clean Air regulations, Corps of Engineers permits, water permits, MSHA, etc., etc. Small operators, in the 100,000 to 2,000,000 TPY category, will not be able to comply with the regulations, and will be forced out of business.

"Emerging Mining Technologies":
Donald Donner, U.S. Bureau of Mines

Western coal holds great promise for the nation because of:

1. the magnitude of the resource;
2. the large quantities of coal found in small areas;
3. good geological conditions;
4. low sulfur content.

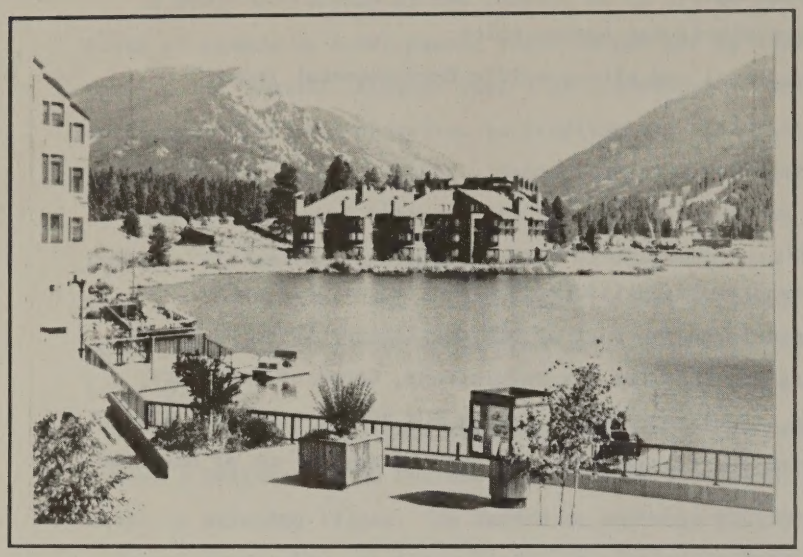
A major problem with Western coal is found in the lack of an infrastructure--both in miners as well as in communities. Mr. Donner noted that never has any mineral venture been subjected to such scrutiny and regulation.

A problem in Western surface mining lies in the dual operation of concurrent mining and reclamation. A means of improvement is the use of truck and shovel operations, instead of draglines; this approach improves segregation of topsoil and overburden, and facilitates proper replacement of materials.

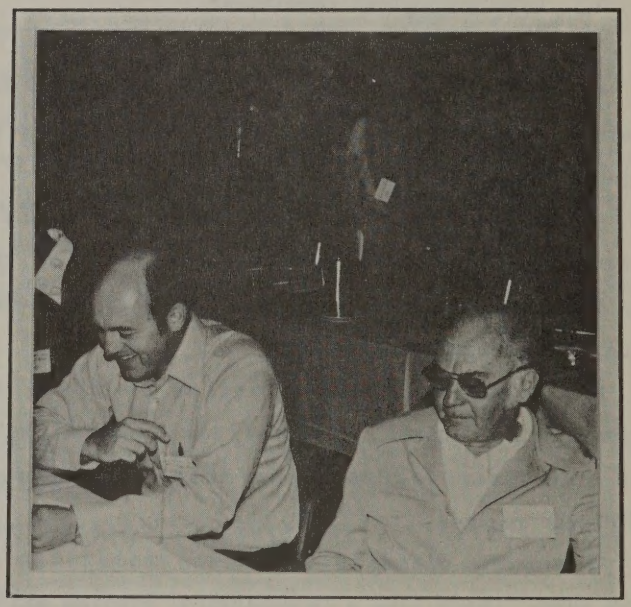
New technologies being examined by the Bureau include haulage tunnels to replace roads, optimization of topsoil thickness, new equipment to reduce costs, and new coal removal equipment. The Bureau is planning new studies on abandoned underground mines and on modeling of hydrologic regimes.

Underground mining research being conducted by the Bureau includes research on mining thick seams, which pose a technological problem and are not included in the coal reserve base. Shield-type supports may be feasible for seams up to ten or twelve feet thick. Shield supports and caving with two conveyors may be feasible for thicker seams. Multiple pass long wall mining is another possible method.

Basically, the Bureau research program in Western coal is oriented towards improved methods to provide lower-cost production, an increased reserve base, and improved mining and reclamation processes. The most encouraging aspect of Western mining to Mr. Donner is the willingness of operators to cooperate and make efforts to meet social objectives such as reclamation. A major weakness exists in technology transfer: in getting results from research into application.



View from Keystone Lodge



William Noll and Sam McFarlane,
U. S. Department of Energy,
Denver, Colorado

SESSION IV

CRITICAL ISSUES

Session Chairman: Joseph B. Smith,
U.S. Bureau of Mines

(Editor's note: This session was a panel discussion moderated by Mr. Smith. Each panelist made a brief presentation; dialogue between panelists and questions from the floor followed.)

"Federal Overview - Department of the Interior":
The Honorable Guy Martin, Assistant Secretary for Land and Water, U.S. Department of the Interior

Mr. Martin spoke in his role as a Federal landlord, a manager in the Federal system for lands, and as a manager of leasing.

He stated that we must have a common understanding of the quality of life and what sort of future is perceived for America's citizens. In terms of the quality of life and the shape of the future, Congress deserves credit for shaping standards on environmental quality, and human conditions through legislation such as the Federal Land Policy and Management Act, the Federal Coal Leasing Act Amendments, the clean air and water acts, MSHA, and other legislation. The states deserve credit for insisting on their legitimate prerogatives.

The major remaining gap in understanding the future is in energy per se. The problem lies in the Congressional failure to resolve the future of energy. Therefore, the major issue is the development of sound energy policies and programs for the future. Additional major critical issues include the market for coal and the organization, health and structure of the coal industry.

Mr. Martin turned to, and focussed on, critical issues relevant to his Federal role as previously stated.

Leasing of Federal minerals resolves around this critical issue: are we going to learn from the past and avoid the repetition of past errors? Neither the old "full speed ahead" approach, nor the "dead stop" situation of the past seven years, is appropriate. Rather, an intermediate speed must be found. Undersecretary Joseph had stated that no Western coal leasing program will survive which is all-or-nothing of either development or no development. The work of Congress in shaping legislation which defines the middle ground is hopeful. Mr. Martin cautioned that the prospects are very limited for revamping the Congressional legislation from either the industry or environmentalist viewpoint. It is a hopeful sign that President Carter has emphasized coal production, and that Secretary of the Interior Andrus has decided to stop litigating and to move ahead.

The leasing issue will be resolved if various interests will take the program being developed and make it work. The leasing program being developed is intended to meet the requirements of the National Environmental Policy Act, and should be able to stand up under legal challenge if there are such challenges.

The second issue relevant to Mr. Martin's role has two facets: land use planning and coal production goals. Land use planning will be the framework for leasing; coal is but one

resource and no single resource will be dominant. Production goals will determine the proper level of leasing; these goals will be arrived at through agency projections and planning, and state and public participation.

It is critical that these facets be accepted by various interests. Will people enter the land use planning process early and work with it? Will production goals and standards be accepted? States must accept their proper role. Industry must be willing to accept a less dominant role than it has had in the past, although industry's role is still highly important. Industry must learn to enter the land use planning process. The environmental community must accept the system, and not misuse it in litigation.

Regarding the relationship between the Federal Government and the states on leasing, it is apparent that decisions on Federal coal leasing are the fulcrum for development. States have either failed to exercise their powers or have forfeited them to the Federal Government. The DOI is asking states to come forward and help in the process, to use their various tools in helping DOI make final decisions on leasing, land use and development. Examples of positive actions in this regard are the amendments now being considered to the Federal Coal Leasing Act Amendments of 1975, to permit mineral and land exchanges, and the DOI-led siting study for a Utah coal-fired power plant. This latter case illustrates the effectiveness of a coalition between industry, environmentalists, state government and the Federal Government in seeking a solution to a problem.

"Industry Overview": Charles W. Margolf,
W. R. Grace and Company

Mr. Margolf emphasized that he spoke as an individual and did not speak for his company or for industry in general; his remarks do not constitute a position of his company or the coal industry.

Mr. Margolf perceives the single most critical issue is freedom. Can America survive as a free nation?

The two major and interrelated aspects of this issue are, first, energy itself, and, second, the upper hand which the system gives to obstructionism.

Energy is the lifeblood of our economy. We are surviving only due to a transfusion of 50 percent of this lifeblood: foreign oil. We control neither the blood supply nor its price. Three Presidents have stated that we must double our coal production by 1985; however, we will not achieve this under the bureaucracy of the Department of the Interior.

The rules of the system do not work equally for both sides. Industry has had an excess of restrictions and constraints placed on it. Yet, it does not matter how good a job an industry is doing, and how many people want the industrial development with its employment, benefits and products. The system, and the rules of the game, permit one person to stop the industry. Only an injunction, based on the National Environmental Policy Act, is required, and the single obstructionist need not have any fiscal responsibility for his action. Therefore, freedom for legitimate industrial decisions is usurped by "a tyranny of one".

Bureaucracy cannot prevent the obstructionism and delays, but Congress can act as it did in the case of the Alaska pipeline when it legislatively declared that NEPA requirements were satisfied.

For all the good intentions of the bureaucratic planners, the result is government control of the provision of goods and services. Thus, the most critical issue is the restoration and preservation of freedom.

There has not been adequate progress in coal development. There have been promises. President Carter has stated that our energy situation calls for the moral equivalent of war. In World War II, the nation's industry, with an incredible burst of activity, delivered the munitions and supplies to defeat our enemies. In the present situation, President Carter has said that the most formidable defense weapon in our arsenal is coal. Yet, in this war, our platoon leaders are the antiwar demonstrators of the late 1960's.

Our present National Energy Plan is to increase the cost of production through energy costs, to decrease energy production, to reduce national security, and to pay more money to foreign countries.

Regarding leased coal, Mr. Margolf stated that the question is not "can the coal be technologically and economically recovered" (the definition of "reserves"). Rather, the questions are "is the coal legally available" and "can it legally be mined?"

Small operators are being driven out of production despite the Federal desire to increase competition and despite legislation to assist small operators. They will not be able to survive delays and to surmount all the legal hurdles.

"CERT Overview": Ed Gabriel,
Executive Director, Council of Energy
Resource Tribes

CERT is a non-profit organization with 25 tribes with energy resources as members. It has a staff of 12 people in Washington, and is opening an office in Denver for technical assistance to the member tribes. It will be staffed with technical experts in fields such as geology, hydrology, law, sociology and environmental sciences.

The tribes feel that they have not received fair treatment by the Bureau of Indian Affairs. They must assemble their own expertise to improve their own decision-making. Mr. Gabriel felt that some of the criticisms of the Federal Government which Mr. Margolf stated are also Indian tribe criticisms of the Government, which has not done a good job of looking after Indian interests.

The tribes differ in their attitudes toward development. CERT itself is neutral; it is neither for nor against development.

Mr. Gabriel stated that "leasing" is not a relevant term; rather, the Indian tribes are concerned with "equity production".

"Federal Overview: Department of Energy":
Robert L. Davies, Director, Office of Coal Supply
and Utilization, U.S. Department of Energy

Coal is essential to the U.S. energy picture. Production must be doubled by 1985; Mr. Davies thinks that we will come close to achieving that objective.

Western coal will be used primarily in the West, especially in the Gulf Coast. About 80 percent of the Western production will be needed in the West; in Texas, 65 percent of the coal which will be needed by 1985 is already under contract. Western coal will be demand-limited, not supply-limited.

The most important issue will be the competitive price of coal vis-a-vis other fuels. Productivity has decreased nationally. Transportation costs are about one-third of the cost of delivered coal. The difference in price between coal and oil is crucial. Future demand for coal also will be dependent upon environmental regulations, especially New Source Performance Standards. The Department of Energy is seeking 0.8 lb.SO_2 per million Btu's as the standard, with a sliding scale, and DOE views the issue as largely an economic one. Public comment on the proposed rules will be critical. The rules for industry will be promulgated in a year.

Regarding industrial use of coal, Mr. Davies feels that the cost of synfuels is not competitive, but that regulations may alter this picture. He is most optimistic about high-Btu coal gasification, especially if costs can be rolled in and if a loan guarantee program is established.

Transportation issues center on upgrading railroads and developing slurry pipelines, both of which are needed.

Dialogue: (Some of the major points from the intrapanel and floor-panel discussion are presented.)

Mr. Martin was asked if Congress is doing a good job. He responded by stating his criticism of the lack of resolution of energy issues by Congress, although Congress has done a good job on surface mining and other legislation. He stated that the main point is that Congress will not undo what it has done in the past decade on environmental legislation. There is not much chance of amending NEPA; therefore, any hope that issues will be resolved by NEPA amendments is merely an evasion of the real problems.

Carl Bagge, President of the National Coal Association, praised DOI for doing the best that any agency can do in developing the Coal Leasing Programmatic Environmental Impact Statement, given the legalistic constraints.

Mr. Margolf expressed his opinion that, no matter how good a job the governmental agencies do, Congress must change the framework to eliminate the "tyranny of one."

Mr. Martin believes that the negative advantage should be with those who do not want development to occur; those who propose development should have to prove their case that the development is needed before they are permitted to proceed.

Don Miller, State Geologist, Wyoming; Carl Bagge, President, National Coal Association; Hollis Dole, ARCO

SESSION V

PREPARATION

Session Chairman: Albert F. Baker,
U.S. Department of Energy

"Drying Characteristics of Rosebud Seam Coal":
Gordon Zeising, Montana College of Mineral Science and Technology

Coal drying has not been heavily practiced in the West, and there is very little information on drying characteristics of Western coals. However, there are good reasons for drying:

1. transportation costs can be reduced;
2. conversion efficiencies can be increased;
3. sulfuric acid mist in boiler firing can be reduced.

The major benefits accrue when coal is dried before transportation.

Because magnetohydrodynamics technology (MHD) requires a very low moisture content in coal, special research on drying has been carried out in conjunction with MHD research. Five percent maximum moisture content is needed for MHD use; slag also constitutes a problem for MHD.

Rosebud coal is one of several being tested. It has a 25 percent moisture content in the coal structure, and 8 to 12 percent ash; the heat value ranges from 8,400 to 9,400 Btu/lb.; on an ash-and-moisture-free basis, the heat value is over 12,000 Btu/lb.

Drying is a function of pore size and character. Moisture is contained in pores and fissures. The research has resulted in the development of drying curves and drying rate curves. At 2 percent moisture, drying apparently results in devolatilization, and the coal is hygroscopic, increasing to 8 percent moisture in 10 minutes.

Five types of equipment were tested in vendor drying tests. These included a ball mill and spray drying, batch fluidization, free-flowing and agglomerated spray-drying, and a vibrating grate fluidized bed dryer.

The Rosebud sub-bituminous coal requires a high dryer temperature due to the pore moisture characteristics. The Btu/lb. requirements for drying are two to three times as high as bituminous coal. Total energy requirements for crushing, grinding, drying from 25 to 5 percent, and gas handling are about 1,285,000 Btu/ton, with 82 percent of this going into the drying itself.

For economical drying prior to transportation, there is no point in reducing the moisture content below 8 percent. One related economics problem is that freight rates increase for processed coal.

"Lignite Upgrading": Sidney Nelson,
Arthur G. McKee and Company

Lignite resources in the West amount to at least 400 billion tons, of which upwards of 16 billion tons are recoverable by surface mining. Lignite is one of the nation's largest energy resources. Lignite use is limited by its properties: it has a low heat content (about 6,500 Btu/lb.), a high moisture content (about 40 percent), high sodium and potassium

content, a tendency to degrade, and a tendency to heat and spontaneously ignite. The sodium and potassium content cause boiler tube fouling. Lignite is low in ash and sulfur, however. Current transportation costs make its use uneconomical beyond a range of several hundred miles from the mine.

Upgrading is being examined to improve the properties of lignite by various means. Reduction in moisture can increase markets and raise the heat value to 9,500 Btu/lb., for example. The objectives of lignite upgrading are to reduce water content, reduce sodium and potassium content, maintain sufficient particle size and strength for handling, and reduce dust. The main research efforts described by Mr. Nelson dealt with drying, handling, storage, and agglomeration.

Early research at Grand Forks involved drying, screening and removing fines. Fines were mixed with various binders, and pelletized, briquetted or extruded. Pelletizing worked well, although large amounts of binder were needed. A later approach involved drying, screening and spraying with oil, which Mr. Nelson characterized as somewhat messy.

The more recent DOE-funded research in which Mr. Nelson was involved was on the effectiveness of drying, mixing with a binder, agglomerating and drying. Ball mills are not efficient for grinding; rod mills are somewhat better, but hammer mills have proven to be best. Grinding to minus 10 mesh is adequate.

Binders are the major cost item. Fifteen candidate binders have been found; most binders are unsatisfactory or too expensive. A modified asphalt emulsion and starch is best; gilsonite is next best. Dried pellets do not have the same properties as dried lignite; they have a maximum strength at about 10 to 15 percent moisture which is a desirable property as it is not economical to dry below 7 percent. A one-inch diameter pellet appears ideal. Briquetting has not been satisfactory, and extrusion appears expensive and gives high extruder die wear.

A conceptual design for a 1.2 million ton per year plant has resulted in an estimated cost of $4.00 to $6.00 per ton, including $1.80 per ton for binder.

"Froth Flotation": Dr. Frank Aplan, Pennsylvania State University

The purpose of froth flotation is to reduce ash and sulfur in coal. It may become increasingly important as the proposed EPA regulations on sulfur removal allow a credit for coal cleaning prior to combustion and flue-gas scrubbing. Also, froth flotation reduces solids loading in thickeners.

Froth flotation commonly results in 50 to 60 percent coal recoveries with very low pyritic sulfur percentages; higher coal recovery increases the pyritic sulfur in the cleaned coal. Unsophisticated circuitry is normally used; Dr. Aplan is conducting research on more sophisticated circuits adapted from forth flotation of ores. Coal depressants are being used; pyrite depressants are an alternative but suitable reagents are not available.

Western coals have special characteristics for flotation. As the coal rank decreases, flotation problems increase and a rapid increase in reagent quantity is needed. Higher-rank Western coals compare to Eastern coals in flotation characteristics; coking coals and bituminous coals for some power plants are suited to cleaning by flotation.

Tests on a Campbell County sub-bituminous coal indicated a 94 percent yield of clean coal could be achieved, although the oily (Barrett oil) reagent floats pyrite.

With the present state of knowledge, individual coals must be studied for the froth flotation characteristics and methods.

"Preparation Potential": Ernest Draeger, McNally Pittsburg Manufacturing Corp.

Western coals offer more versatility for preparation than do Eastern coals. To produce a marketable product which meets specifications for utilization, two types of preparation can be considered:

1. size reduction of ROM coal; this is usually the only preparation done with Western coals which have low sulfur, shale and other undesirable constituents;
2. cleaning.

Cleaning usually involves either a dense medium or water. Magnetite is the usual constituent of dense medium cleaning circuits; 43 percent of Western plants are dense medium. Water processes, such as the Baum jig, are less efficient but provide lower costs. Non-aqueous cleaning is seldom used in the West due to a tendency to dustiness, a limited size range for feasible cleaning, imprecise gravity cut, and general infeasibility for hard-to-clean coals. It may become more important, though, due to water limitations in the West.

New research may yield cleaning processes important to arid areas. Similarly, new research may improve thermal drying technologies. Drying will become increasingly important due to long shipping distances and resultant high freight rates.

In cleaning and thermal drying every coal situation requires individual study. Preparation will become increasingly important with Western coal.

Craig Hayes, EBASCO; Lee Olver, Denver Research Institute; Ernest Messer, Espey, Huston and Assoc.; John Phinney, Conoco Coal Development Company

SESSION VI

TRANSPORTATION

Session Chairman: Virgil W. Carmichael,
Vice President - Exploration
The North American Coal Corporation

"Railroad Perspective": John Hertog,
Burlington Northern Railroad

Mr. Hertog's presentation was devoted to the activities being undertaken by railroads to enable them to meet the challenges of increased Western coal production.

Burlington Northern transported 53 million tons of coal in 1977; it is estimated that BN will haul 60 million tons in 1978 and from 115 to 140 million tons in 1982. The company is currently undertaking the largest railroad construction program of this century. The new Gillette-to-Orin line of 116 miles will be completed by late 1979 at a cost of $125 million. A total of 4,300 miles of BN main line and 800 miles of subsidiary lines will be impacted by coal transportation; new ballast, signals, double-tracking and other improvements are being made. A major new support facility has been constructed at Alliance, Nebraska, at a cost of $45 million.

BN has 113 unit coal trains. These indicate a commitment between the miner, the railroad and the utility. Modeling and computer simulations of train performance, single-track and double-track traffic, and other operational factors are being used.

Mr. Hertog believes that the present problems of turnaround time will be solved. The railroads can handle the prospective coal traffic, but have a need for capital. Slurry pipelines would "skim the cream" from the coal transportation business and thereby would damage the ability of the railroads to finance their proposed capital development programs. The mere threat of a slurry pipeline weakens BN's opportunity to attract capital.

BN is working with communities on the problem of grade separations. Substantial funds from the public sector will be required.

Freight rates are increasing, even though the volume handled is increasing. Normally, increases in volume lead to rate reductions, but the rate increases are needed to generate earnings to pay for the investments in improvements. Dried or prepared coal is a different or more valuable commodity than run-of-mine coal; therefore, a higher rate should be charged for transporting it, according to Mr. Hertog. He noted that the cost of doing business has tripled in the last four years.

"Pipeline Perspective": Frank Odasz,
Energy Transportation Systems, Inc.

The issue raised by Mr. Odasz is whether every single ton of the prospective 260 million tons of Wyoming coal to be transported should be moved by rail. With a humorous story, he illustrated the point that one's options should never be cut off. The railroads have a monopoly on coal movement which leaves no options, according to Mr. Odasz.

The advantages of slurry pipelines are:

1. for Wyoming:

   water conservation;
   environmental quality;
   labor --"boom-bust" problems reduced;
   revenue to state government;

2. for the nation:

   energy savings;
   economics.

Water consumption for the proposed ETSI pipeline will be 15,000 acre-feet per year to transport 25 million tons of coal annually. This is one-seventh of the water which would be required by mine-mouth power plants consuming that amount of coal. The Madison Formation aquifer could provide 50,000 acre-feet per year without recharge, according to a study by the Office of Technology Assessment. In 1974, Wyoming's legislature allocated 15,000 acre-feet per year to the ETSI pipeline, and stipulated a number of rigorous conditions.

Mr. Odasz stated that, of the various environmental organizations, the Environmental Defense Fund is the only one which has opposed the pipeline. The Congressional defeat of legislation which would have given eminent domain powers to slurry pipeline companies was defeated by the Eastern vote in Congress. Mr. Odasz stated that the existence of slurry pipelines will, through competition, result in reduced railroad rates. Arkansas has calculated a $16 billion savings to consumers if the slurry pipelines are constructed.

"Federal Perspective: Department of Energy":
Robert L. Davies, U.S. Department of Energy

The only real supply problem which the Department of Energy perceives in meeting President Carter's coal production goals is in transportation. The Department of Energy has gone on record that all forms of transportation are needed.

Transportation costs are very important in the national effort to reduce the consumption of imported oil. Utilities will not convert to coal if coal does not have an economic advantage over oil; transportation is a high percentage of coal costs, and rising transportation costs can only be detrimental.

Even though the predominant markets for Western Coal are in the West and Gulf Coast states, the transportation system for these markets is not adequate.

The present railroad rate system interferes with the use of coal. DOE's position is that tariffs should be based on cost plus a reasonable profit. Capital needs can be met by private financing plus Federal assistance, especially, the loan guarantee program operated by the Department of Transportation.

The trucking industry moves 12 percent of the nation's coal. As industry turns more and more to the consumption of coal, trucking will become more important in handling the smaller shipments of coal. Problems include the trucking dependence upon petroleum and size-weight limits on trucks. In the West, about $1 billion will be needed for road improvements due to increased movement of coal by truck.

Barges transport 11 percent of the nation's coal, and are the cheapest form of coal transportation.

Slurry pipelines are needed. The Black Mesa pipeline transportation costs are about one-half the cost of railroad transportation.

DOE is supporting high-Btu gasification which will result in energy movement by pipeline. Mine-mouth power generation and long-distance electrical transmission have the disadvantages of high water consumption and high electrical losses. DOE is not strongly supporting possible power grid interties, although the severe winter of 1977-78, with the coal strike, indicated the value of such interties.

Conference Participants

Carl Bagge and Undersecretary of the Interior James Joseph conversing

SESSION VII

UTILIZATION AND CONVERSION

Session Chairman: Dr. Kenneth L. Clifford,
Electric Power Research Institute

"Gasification": Ted J. Pollaert,
American Lurgi Corporation

Western coal is the ideal feedstock for the Lurgi gasification process; it is the best in the world in this respect.

The primary reason for this excellent suitability is that each reaction in the gasification process proceeds at the lowest possible temperature. Methane formation is thereby favored; oxygen use is minimized, with a resultant reduction in the need for steam. Additionally, tar formation coats the steel and reduces corrosion. Problems with Western coals include the friable character and the resulting high percentage of undersized particles.

A gasification plant will have a significant socio-economic effect in the rural West. A construction force of 600 workers is needed. The resulting indirect population would total about 10,000 people. Air pollution and water resource impacts will be small. Fabrication requirements for plant components should not pose any problem.

The first plants to be built will probably be those of Commonwealth Edison in Illinois, the American Natural Gas plant in North Dakota, and Carter Oil's medium-Btu plant in Texas. Other projects are apparently dormant. The Commonwealth Edison plant is a combined-cycle power plant with two gasifiers, one of which will be standby. It will be able to use a variety of coals.

The next generation plant is the Mark IV gasifier recently started at South Africa's SASOL project. It will have a 20 percent higher yield. It is hoped that the feed will be able to contain more fines. A 1,500-psig gasifier is to be tried in Germany; high energy losses through the lockhopper appear to be a significant project. A slagging bath gasifier being developed by Conoco at Westfield, Scotland, will probably be better suited to Eastern coals.

"Liquefaction": John A. Phinney,
Conoco Coal Development Company

Liquefaction processes are being developed which are applicable to both Western and Eastern coals. Mr. Phinney's definition of liquefaction for this presentation is the conversion of coal to clean distillate oils which are interchangeable with petroleum; byproducts include heavy liquids, gases and chemicals.

Liquefaction's history includes the German Fischer-Tropsch hydrogenization process from 1930 to 1945 and the current 50,000 barrel per day SASOL plant in South Africa which is scheduled for completion in 1982. Mr. Phinney cited the reasons why America has not developed liquefaction:

1. political problems: the lack of a National Energy Plan and the regulation problems;
2. economics: $25 - $35 per barrel projected costs;
3. environmental and social problems;

4. technical factors.

The National Energy Plan should provide some protection against high risks which industry must bear.

Liquefaction processes are either direct or indirect; in the latter case, coal is converted to gas which is then converted to liquid.

The five processes which are closest to commercialization were briefly discussed. These include indirect conversion via water gas conversion, hydrogenation, H-Coal, Exxon's Donor Solvent, and SRC-II.

Coal selection is important because different coals behave differently. Oxygen content is important. Western coals are better for indirect liquefaction processes, whereas Eastern coals are superior for direct processes.

Mr. Phinney postulated a scenario in which 10 percent of all gasoline would by derived synthetically. This would total one million barrels per day of synthetic coal liquids, and would require 10 to 15 plants, 190 to 250 million tons of coal per year, 170,000 to 225,000 acre-feet of water consumption per year, 10,000 to 15,000 employees, and a capital investment of $20 to 30 billion. If the capital investment were spread over a 10-year period, it would only amount to 10 percent of our current energy investment per year. The cost to the gasoline purchaser would be five cents per gallon more for gasoline with 10 percent synfuel.

"A Century of Western Coal Utilization":
L.S. Burt, Public Service Company of Colorado

Public Service Company of Colorado (PSCO) has been burning Western coals throughout its existence with increasing technical sophistication with each new steam generator and with each new source of coal. The company, or its predecessors, have a 110-year history with coal. While pulverized coal technology was in its infancy, PSCO applied its features to Western coal at Valmont Station in 1924. Subsequent boiler designs were based on principles which the company had learned from previous units. Through more than 18 boilers, ranging from 275,000 pounds per hour to 3,700,000 pounds per hour, Public Service has attempted the removal of ash by slag tapping, has provided longer and more tortuous flame paths, and has determined that turbulent burning and generously sized furnaces, allowing no more than 1800°F furnace exit gas temperature, produce the best results.

A boiler design is a completely coordinated assembly of fuel burning equipment: furnace, boiler, superheater, reheater, heat recovery equipment and fans. The furnace design controls the efficiency of combustion of the fuel and regulates the temperature of the gases leaving the furnace. The problem of ash deposits in the furnace in the form of slag and in the convection sections by fouling, bridging and pluggage is a major challenge to the designer as well as the operator. The designer provides boiler surfaces of the proper amount and form to keep the ash in a manageable state and provides the operator with soot-blowers and cleaning equipment so that efficient heat transfer can be maintained.

For the boiler designer to do his job and to provide an efficient, reliable, operable boiler he must, at the very outset of design, have complete information of all of the coal and ash characteristics of the exact coal to be burned: the performance coal. Because each of the coal and ash characteristics has significant impacts on the capability of the boiler

to burn Western coal, on the design of the entire plant facility including subsidiary equipment and building, and upon the cost of the project, each characteristic must be accurately analyzed, quantified and the best experienced judgment incorporated in the design.

Mr. Burt believes that Western coal holds no great mysteries, but it must be treated with considerable knowledge and respect if a satisfactory project is to result.

"Combustion Research": Gordon Gronhovd, Grand Forks Energy Technology Center, U.S. Department of Energy

Grand Forks Energy Technology Center (GFETC) has responsibilities for low-rank coal research.

Mr. Gronhovd described research on boiler conversion to handle high moisture, high-fouling lignites and coals with varying ash characteristics. Most Western coal has inherent, not extraneous ash; it is both organically bound and finely dispersed clay and silica. The combustion processes of industrial spreader stokers, cyclone fired boilers, and pulverized coal boilers are being examined. Conclusions are that cyclone fouling is less than one-half that of pulverized coal fouling, and that the sodium content of the coal is the best indicator to predict increased fouling. Further, fouling is reduced by calcium additions.

GFETC has a test facility with simulated boiler tubes containing thermocouples inserted into the hot gas zones. Thus, fouling is correlated with actual conditions, and the mechanisms of fouling can be analyzed. Analytical techniques used to identify and characterize the entire slagging - fouling problem include hot-stage microscopes, scanning electron microscope, x-ray diffraction, float-sink tests, and ion exchange.

GFETC also has a 6-inch diameter fluidized bed combustor for research. Tests indicate that sulfur retention of 40 to 60 percent can be achieved with Beulah lignites, and sodium volatilization is low due to the low bed temperature.

Jeanette Paschall, ITT, and Sidney Nelson, Arthur G. McKee and Co., on a side trip to Buckskin Joe, Colorado; they are standing on an "arristra" which was used for gold milling in the last century.

SESSION VIII

UTILIZATION AND

ENVIRONMENTAL EFFECTS

Session Chairman: Dr. Robert L. Pearson,
Public Service Company of Colorado

(Editor's Note: This session was conducted as a panel. Each panelist presented a brief opening statement. Dialogue between the panelists and between participants and panelists comprised most of the session. The opening statements are summarized, followed by a summary of the key items of the open discussion.)

"Air Pollution Modeling":
Warner Reeser, Colorado Department of Health

Modeling is intended to extend knowledge to an area for which there is no knowledge; for example, into future time or new space. Emission modeling is central in air quality permits, and is the only tool available for prognosticating the desirability of issuing a permit in terms of future compliance.

Modeling is subject to some basic misconceptions. It is not an end in itself, but should be considered as a tool in decision-making. Whether one modeling approach is better than another depends upon the situation being modeled. Also, models themselves are less important than the inputs: meteorological data, emissions data, and coal quality. Basic problems are: insufficient knowledge about emissions, a lack of meteorology data, and a lack of models for complex terrains.

"Air Pollution Regulation": David Joseph,
Region VIII, U.S. Environmental Protection Agency

New Source Performance Standards (NSPS) are being promulgated for coal-fired power plants and for coal preparation and cleaning plants. Prevention of Significant Deterioration (PSD) regulations were revised in June, 1978, to conform to the 1977 Clean Air Act Amendments. Stack height regulations are soon to be issued in draft form. State regulations must be revised to conform.

Section III of the 1977 Clean Air Act Amendments requires 85 percent SO_2 removal and continuous monitors. PSD regulations are applicable to Total Suspended Solids and SO_2, and are implemented by the preconstruction review and permit process. New sources must apply Best Available Control Technology (BACT) for all types of pollutants covered by the Act. Increases in ambient concentrations are limited to prescribed increments which are a function of area classifications (Class I, II or III or Non-Attainment Air Quality areas). Stack height increases which exceed Good Engineering Practice (GEP) do not affect the degree of emission control required, although case-by-case exceptions can be made on the basis of terrain.

"Coal Handling and Blending": C.R. Pelley, AMAX Coal Company

Blending or mixing coal can be used to develop a predetermined coal character, usually to achieve a certain sulfur content. Coal is not homogeneous; sulfur content varies within seams.

AMAX has analyzed, and developed statistical correlations between as-received coal, silo coal and utility boiler feed coal. Statistically, a theoretical 50-50 blend for one percent sulfur may actually require a considerably different blend, such as 75-25, to obtain the desired sulfur content, due to deviations in the actual coal. Such deviations are greater in underground-mined coal than in surface-mined coal. Other effects must also be examined before blending, such as sodium, calcium, slags, and eutectic effects in combustion.

Mr. Pelley showed a number of pictures of coal-handling facilities.

"Environmental Effects: Visibility and Vegetation": Terry Thoem, Region VIII, U.S. Environmental Protection Agency

Production in the six-State Region VIII totaled about 100 million tons in 1977 and is realistically predicted to total 300 million tons by 1985. The 1977 Western generating capacity of about 16,000 MW will double by 1985 to slightly greater than 32,000 MW. Because a typical 1000 MW power plant annually emits about 40,000 tons of SO_2, 25,000 tons of NO_x, and 3,500 tons of fine particulate matter, this increased generating capacity will represent an additional atmosphere pollution burden. Constraints governing the amount of additional pollution burden which can be accepted exist in the form of various Federal and State legislation and regulations. Two of these constraints are vegetation and visibility.

National ambient air quality standards have been established for five "criteria" pollutants (SO_2, NO_2, PM, O_3, and CO) in order to protect human health and welfare. The secondary standards (welfare) provide protection of vegetation. SO_2 entering through stomates in the leaf forms sulfite ions which may interact with cell membranes, enzymes or other cellular components to cause altered metabolic functions and changes in plant cell structure. Subsequent destruction of foliar tissue causes reduced photosynthesis which in turn may result in decreased plant growth and/or yield.

Nitrogen oxides can cause changes in the pH of the cell and can also cause effects similar to those associated with SO_2. The other effect of NO_2 is an indirect one, i.e., its role in the formation of photochemical oxidants. Ozone can inhibit photosynthesis and may cause leakage of water and potassium ions from leaves.

Fine particulate matter contains certain organic and inorganic compounds which may cause plant tissue burning. Deposition of particles on leaves can cause a reduction of light available to the plant for photosynthesis and starch formation. Plugging of the stomates may also occur. However, the principal injurious effects seem to be related to the chemical composition.

Congress declared in the Clean Air Act Amendments of 1977 that it is a national goal to prevent any future and to remedy any existing impairment of visibility in mandatory Class I Federal areas. A stringent timetable for action was mandated. EPA, the Federal Land Managers and the States all have responsibilities under the visibility requirements of the Act.

DOI in consultation with other Federal Land Managers has identified mandatory Class I areas where visibility is considered to be an important value; this condition occurs in 154 of the 159 areas.

EPA is to submit a report to Congress by February 7, 1979, which presents available methods for attaining the national goal, including recommendations for:

1. Methods for measuring and characterizing visibility impairment;
2. Modeling techniques for anticipating the extent of man-made contribution to visibility impairment;
3. Methods for preventing such air pollution and the resultant visibility impairment;
4. Identification of the types of pollutants which may significantly contribute to visibility impairment.

No later than August 7, 1979, EPA must promulgate regulations which assure reasonable progress toward meeting the national goal. These regulations shall provide guidelines to the States on appropriate techniques for achieving the national goal and shall require each State Implementation Plan (SIP) to include adequate provisions which may be necessary to meet the national goal.

The SIP's must 1) require Best Available Retrofit Technology (BART) on sources less than 15 years old which are deemed to cause visibility impairment and 2) provide for a long-term strategy for making progress toward the national goal. EPA may exempt sources from SIP requirements upon concurrence by the Federal Land Manager (FLM), who also has a continuing responsibility to protect visibility in Class I areas. If it is demonstrated by the FLM to the State that an adverse impact on visibility will occur, the PSD permit will not be issued even if applicable PSD increments are met.

Explicit guidance to the States will be difficult for EPA to develop due to the paucity of visibility data in existence, the short time frame in which to develop guidance and the complexity of the visibility issue.

Mr. Thoem described some of the research being done on visibility effects of pollutants. Issues to be resolved include the following:

1. Do the visibility portions of the Act protect only inside the area boundaries, or inside/outside, or outside/inside visibility?
2. How is a representative accurate visibility established and defined? Short term vs long term?
3. Do different areas deserve different degrees of protection? Also, East vs West?
4. What are: significant visibility impairment, percent of time, degree, prevailing vs one view, seasonal use?
5. Should both plume blight and regional visibility degradation be considered as visibility impairment?
6. How should atmospheric discoloration be defined?
7. Should operational visibility monitoring be performed? Point vs long path?
8. Should air quality parameters be correlated with visibility monitoring?
9. How can predictive tools best be validated?

Whatever the specifics of the visibility regulations are, they must be cost effective, defendable and enforceable.

"Particulate Control Technology":
Dr. Robert L. Pearson, Public Service Company of Colorado

Electrostatic precipitators (ESP) have not worked well on low-sulfur Western coals. Older ESP's were cold-side (300°F); next, flue-gas conditioning was used; new ESP's are hot-side (800°F) with gas conditioning. The new precipitator installed on a Public Service Company of Colorado plant, with EPRI funding, is unique in the world. Additionally, Public Service is now constructing two baghouses to control dust emissions. Wet scrubbers as required offer varying degrees of success.

Discussion

Mr. Joseph stated that EPA wants debate and opinions on the proposed scrubber regulations. Specific items include changing the averaging time, and permitting partial scrubbing with varying sulfur contents and diverting flue gas for stack gas reheat. The regulations may affect export coal more than mine-mouth generation.

Mr. Pelley observed that industry is now faced with yet another moving target; he feels the new regulations will adversely impact the markets for Western coal. He noted an AMAX computer study on the sulfur content of coal shipped; from the producer's viewpoint, a rolling 30-day average of sulfur content would be workable in controlling sulfur.

Mr. Reeser noted that the focus of air quality control has shifted from emissions to ambient air conditions, health, and environmental values. The emission rates for New York City should not be imposed upon Brush, Colorado. He hopes that the new regulations do not result in an increase in gross emissions.

Mr. Pearson feels that an 85 percent sulfur reduction is unnecessarily stringent for the West. It is more difficult to obtain 85 percent sulfur dioxide removal by scrubbing when the sulfur content of the coal is low. His company has estimated the costs of scrubbers for its proposed 500 MW plant near Brush, Colorado. The scrubbers will cost $45 million; additional plant capacity to operate the scrubbers will require an additional $11 million investment, and steam heat exchangers for stack gas reheat will cost $1.5 million. These figures total about $57 million, which is a 25 percent increase in the cost of the power plant. The scrubbers studied would remove 80 percent of the SO_2. To achieve 85 percent removal and ensure compliance, the design capacity would have to be 90 percent, and would cost 10 to 20 percent more than the above estimate. If 60 percent removal were permissible, the methods for sulfur control available to the company would be much greater; for example, dry scrubbing and baghouses could be used.

Participants noted the amount of limestone to be mined, shipped and handled (the amount has been estimated by Public Service as 32,000 tons per year limestone and 100,000 tons per year sludge for their 60 percent scrubbing).

Mr. Joseph observed that the philosophy behind the proposed regulations is to force technological development.

SESSION IX

PROBLEMS - PROGRESS - PROMISES:

A SUMMARY

Session Chairman: Hollis Dole,
Atlantic Richfield Company

Mr. Dole observed that a summary of the problems, progress and promises of Western coal is not an easy task. After the many observations and many sessions of the Conference, it is obvious that the most concise summary is that turmoil and frustration have been imposed upon a great national resource.

(Editor's note: The presentations of the speakers of this session are reproduced in their entirety rather than in summary).

"Problems of the Western Coal Industry":
Gerald Rupp, Atlantic Richfield Company

The Western coal industry is undergoing rapid change and evolution. It is basically a new industry; some would call it reborn because the industry has been around a long time and significant volumes of coal were produced in the mid-1940's. However, the industry as we know it today is much different than the industry which has existed for many years. The volume of production is increasing rapidly, many companies new to the coal industry are involved in Western coal, the industry is heavily impacted by the new national environmental consciousness and the legal/regulatory framework in which the industry must operate is just being established.

The problems facing the Western coal industry fall into two broad categories - physical problems and legal/regulatory/political problems. Of the two categories the legal/political problems are the more significant and are having the most impact on the industry today.

Physical Problems

I would like to cover briefly those physical problems that are perhaps unique to the Western coal industry.

1. Coal Quality - Western coal in general has a lower heating content than coal in the Midwest and the East. This puts Western coal at a competitive disadvantage. This disadvantage, however, is offset by the low sulfur and ash content that generally exists in Western coal.
2. Distance to Markets - The major markets for Western coal are in the Plains States, the Midwest, and the South. These markets are a long distance from the major Western coal sources and the cost of transportation is often equal to, or two to three times greater than, the cost of the coal itself. This is a competitive disadvantage.
3. Transportation - Mr. John Hertog of the Burlington Northern confirmed the other night that the existing rail capacity is inadequate to handle the expected volume of coal shipments. He did state, however, that steps are being taken and that in his opinion rail capacity will be adequate in the foreseeable future. Mr. Frank

Odasz of Energy Transportation Systems, Inc. confirmed that the slurry pipeline will not be built in the immediate future. The transportation problem is a real problem for Western coal, but that is one that will be solved in the foreseeable future.

4. Sparse Population - The sparse population in the Western coal area causes problems in several ways. It causes coal operators problems because there is an inadequate labor pool. Therefore, many employees have to be recruited from outside the area. It is often difficult to recruit because of the small towns, inadequate facilities/ services, the long commutes, and the relative isolation of the area.
   Local communities also have problems as pointed out by Mr. Throne of the Powder River Basin Resource Council. The influx of new people causes an overload on existing services and facilities, housing shortages occur, the cost of living rises significantly, and the tax load on the existing populace increases. The new coal projects will pay for mitigation of their impact under the existing tax structure, but despite all of the talk of recent years, there is no good mechanism yet for getting the available financing to the local communities up front where it is needed.
5. Environment - As pointed out by Governor Herschler, the environment of the area is fragile. The most significant problem is the relative lack of moisture. Because of this lack of moisture, the area is not conducive to rapid rebuilding of the soil and to quick recovery of vegetative cover. Therefore, reclamation in the West must be done very carefully, and generally takes longer than it does in the Midwest or East.

Legal/Regulatory/Political Problems

As mentioned previously, the most significant problems facing the Western coal industry are those in the legal/regulatory/political area.

The Western coal industry is unique because of the extent of Federal ownership. The Federal Government owns approximately 60 percent of the coal in the West - some estimate that the effective control is about 80 percent due to the pattern of ownership of both the minerals and surface. Assistant Secretary Guy Martin stated the other night that the Federal Government will indeed dictate the future of the Western coal industry. Every law passed and every policy adopted which affects the coal industry affects the Western coal industry.

As we have heard numerous times this past week, Congress has passed a series of laws in the last eight to ten years which affect the Western coal industry. The regulatory agencies and the coal operators are trying to digest this package of new laws, and public interest groups are participating in the process also. As a result, the industry is in a real state of turmoil at present and it is going to get worse before it gets better. This turmoil is caused by several factors:

1. uncertain, changing and often excessive guidelines;
2. uncertain and overlapping jurisdiction by an increasing number of regulatory agencies;
3. increasing permits and uncertain permit requirements.

All three of these items are obviously tied together but I would like to discuss each one separately for a few minutes.

Uncertain, Changing and Often Excessive Guidelines

Some of the laws and regulations which have been enacted and promulgated in the past eight to ten years which affect the Western coal industry are as follows:

1. The National Environmental Policy Act of 1969 - An Environmental Impact Statement is required for any Federal action which is deemed major. This requirement has not only been interpreted to apply to approval of mining and reclamation plans but also to rights-of-way for pipelines, roads, power lines, and any permit which might be associated somehow with a mining project. Assistant Secretary Guy Martin admitted the other night that the current EIS process is not right and needs to be improved.
2. Surface Mining and Reclamation Act of 1977 - The process of developing regulations which will govern mining and reclamation operations, interpreting those regulations, and developing policy is evolving right now.
3. Coal Mining Operating Regulations and Surface Management of Federally Owned Coal Resources Regulations - These regulations were developed several years ago, are currently being changed, and also apply to the mining and reclamation of Federal coal.
4. Coal Leasing Act Amendments of 1975 - As we have heard this past week, these amendments contain due diligence requirements which force an operator to produce a certain percentage of the coal by a certain date or risk losing the lease. The Amendments also increase the royalties on Federal coal significantly.
5. Clean Air Act of 1970 and the Clean Air Act Amendments of 1977 - As we heard last night, the regulations being developed under these Acts directly affect the coal industry, and are still being changed and modified. In addition, the regulations proposed this week by the EPA to require coal-fired power plants to remove 85 percent of the SO_2 regardless of the sulfur content of the coal burned will impact the market area for Western coal.
6. Water Pollution Control Act Amendments of 1972 and the Clean Water Act of 1977 - The regulations and interpretations under this Act are also going undergoing change and will have significant impact on mining operations in the future.
7. Endangered Species Act, Fish and Wildlife Coordination Act, Bald Eagle Protection Act, and Migratory Bird Treaty - These Acts all impact the Western coal industry and could prohibit mining in certain areas or prohibit mining of a certain portion of an existing coal property. These wildlife-associated Acts will probably become increasingly significant in the future.
8. Coal Mine Health and Safety Act of 1969, Coal Mine Health and Safety Act Amendments of 1977, and Occupational Safety and Health Act of 1970 - These Acts have all had a major impact on the Western coal industry.

Almost everyone agrees with the concept of these new laws and the new standards which have been set. However, the process of developing regulations for these Acts, interpreting the Acts and regulations, and establishing policy is where the difficulty and turmoil set in.

We are going through a period of continual evolution and change, and the guidelines almost always become more stringent.

The regulations and guidelines under which the industry must operate are also becoming longer and more detailed. In fact, we are seeing regulations being developed which no longer merely set standards and goals but rather give step by step instructions on how operators are to do things. This severely limits the flexibility and creativity of an operator to develop better ways to accomplish the same goals. It also is increasingly difficult for industry's voice to be heard in the process of developing regulations and guidelines. As a result the industry is resorting more and more to litigation, which is not desirable and makes everybody uncomfortable.

Another way in which the Federal Government has contributed to the uncertain and changing guidelines is the leasing moratorium which has been in existence since 1971. There is uncertainty over when, where, and how leasing might start again. Mr. Charles Margolf pointed out that there have been several unsuccessful attempts to restart the leasing. Assistant Secretary Guy Martin told us that in his opinion the only leasing program that will work in the future is one in which all parties - the Federal Government, the States, the coal operators, the coal customers, the environmental organizations, and the public interest groups - are involved in the decision-making process. However, only one dissatisfied person can delay or stop the process by initiating a lawsuit. It is possible that we are heading for some kind of process similar to binding arbitration.

In addition to the Federal Government, all of the States have been developing new laws and regulations governing coal mining as well. All of the Western coal States have developed new mining and reclamation laws within the past eight years. Some of the States have developed industrial siting laws, air quality laws, and water quality laws, and almost all of them have significantly increased the taxes applicable to coal production. The State regulatory agencies go through the same process the Federal regulatory agencies go through in development of regulations and evolution of interpretation. In addition, the State agencies have to attempt to conform with Federal laws where necessary, or in some cases challenge the Federal Government. All of these activities contribute to the uncertain and changing guidelines under which the industry must operate.

Finally, a significant amount of the coal in the West lies within the borders of Indian Reservations. Mr. Gabriel pointed out the other night that all of the Indian Tribes are now trying to exert administrative independence and establish control over their own resources. They are doing this through court challenges, renegotiation of leases, and in some cases cancellation of leases. All of this activity contributes to the uncertain and changing guidelines.

Uncertain and Overlapping Jurisdiction by an Increasing Number of Regulatory Agencies

Federal ownership can mean control/administration by different agencies. For example, the Bureau of Land Management and the U.S. Forest Service can administer the surface and/ or coal in the coal areas. This situation exists at our Black Thunder Mine and property. The Bureau of Land Management administers most of the coal, but the U.S. Forest Service administers the Federal surface in the area and a small portion of the coal. These two

agencies have different laws, regulations, and attitudes and, unfortunately, they are not located within the same department. The Bureau of Land Management is located within the Department of the Interior and the U.S. Forest Service is located within the Department of Agriculture. This separation of administrative authority can have negative impacts. At Black Thunder, for example, Atlantic Richfield was forced to relocate its plant site to a location everybody recognized as less desirable because of conflicts which arose due to the dual administration.

There are also an increasing number of agencies enforcing the new laws, regulations, and performance standards. Some of the new laws create new agencies to administer certain activities. In other cases, existing agencies are expanding their jurisdiction to cover new areas or are exercising jurisdiction in areas where they have always had authority but have never exercised it.

The States also have many agencies which exert jurisdiction over coal projects. Often the jurisdictions of these various State agencies are uncertain and often they overlap. Not only do their jurisdictions often overlap with each other, but they almost always overlap with the jurisdiction of the Federal agencies. This causes confusion, conflict, delay, and frustration, and it contributes to the turmoil which exists in the industry today.

The increasing independence being exerted by the various Indian Tribes also contributes to the turmoil and confusion which exists in the industry.

The operators must set up new and separate staffs just to deal with all of these agencies. Many of the smaller companies cannot afford to do this and are being driven out of the industry.

Increasing Permits and Uncertain Permit Requirements

The number of permits required to open and operate a coal mine in the West is escalating rapidly. For example, we have identified at this time over fifty major permits which are required to open or operate our proposed Coal Creek Mine. In addition, there are many plans which must be filed with various agencies such as the Mine Safety and Health Administration which could be regarded as permits or approvals. At our Black Thunder Mine we already have over ninety permits.

Mr. Margolf referred to a flowsheet developed by the Mountain Plains Federal Regional Council which details the permitting procedure for surface mining of coal on Federal land or coal deposits. This flowsheet is over twenty feet long and does not include State permitting requirements. Although developed last year, the flowsheet is already out of date because of the changing situation. The purpose of this effort was to define the entire permitting process to see if it could be streamlined somehow without relaxing any environmental standards. This is a highly commendable effort and we support it, but I am unaware of any followup to this effort.

In addition to the escalating number of permits, the requirements for the various permits are constantly changing and escalating. This constant change is tied in with the new regulations, new interpretations as new knowledge is gained, and the escalating demand for new information.

The permitting process is becoming so bulky, so lengthy, and changing so fast that it

is very difficult to reach the target. In addition, there is a tremendous amount of duplication within the process. The inability to get through the process in a timely and predictable timeframe causes many negative impacts. It slows the development of Western coal, prevents planning by the operators, customers, and the local communities, thereby increasing their risk, prohibits the small operator, and raises the cost of production.

The permitting process can be streamlined while still maintaining the high environmental standards. However, I do not see any signs of this happening in the near future.

Summary

In summary then, the Western coal industry is basically a new industry undergoing rapid change and evolution. The most serious problems at present are in the legal/regulatory/political area. These problems are causing considerable turmoil because of:

1. uncertain, changing and often excessive guidelines;
2. uncertain and overlapping jurisdiction by an increasing number of regulatory agencies;
3. increasing permits and uncertain permit requirements.

The turmoil that exists causes numerous negative impacts:

1. it slows the development of Western coal;
2. it prevents planning by operators, customers, and local communities, thereby exposing them to a high degree of risk;
3. there is a high level of frustration within the industry;
4. it keeps new companies out of the industry;
5. it is driving small operators out of the business;
6. it increases the cost of production.

This state of turmoil will probably last for at least the next five to ten years before the system settles out and the industry becomes stabilized.

"Progress with Western Coal Development":
Dan Miller, State Geologist, Wyoming Geological Survey

It must be obvious to everyone from four days of discussion of Western Coal that "progress", like beauty, is in the eyes of the beholder.

With regard to the progress that has been made perhaps it would be best to reiterate that there are four principal groups involved, and these groups in a manner of speaking, resemble the main characters in the story of the Wizard of Oz. You recall that Dorothy, through no fault of her own, found herself in the strange magical Land of Oz where she was advised to follow the Yellow Brick Road that would lead her to the Wizard, and that the Wizard was the only one who could help her return to Kansas. She was also advised it would be a difficult journey and to beware of the false roads that might lead her astray.

In our case we have four groups, the:

1. Mining Industry - that does all of the real productive work, and takes all the risks; it is like the scarecrow, the lion, and the tin man, who are continuously searching for brains, courage, and heart.
2. States - that must react to Federal action and still carry the direct burden of impact on its lands, communities, and people.

3. Transportation and Marketing - that must anticipate future needs and services for the public.

4. Federal Government - that must accept full responsibility for the management of Federal lands.

What may seem like progress to any one of these groups may not seem the same to the other groups.

Let's begin with at least one kind of progress, and look at the bottom line, the production history of seven Western States since 1970. Table 1 shows that in 8 years, Western coal production has increased about 500 percent from 34.6 million tons per year to over 165 million tons per year.

TABLE 1

WESTERN COAL PRODUCTION

(Millions of Tons)

	1970	1977	1978 (Est.)
Arizona	0.1	11.8	11.9
Colorado	6.0	12.5	14.5
Montana	3.4	27.6	29.0
New Mexico	7.4	11.6	15.0
North Dakota	5.6	18.8	20.5
Utah	4.7	8.8	16.9
Wyoming	7.4	44.0	58.0
TOTAL	34.6	135.1 (P)	165.8
U. S. TOTAL	603	689	710 (Est.)

(P) - Preliminary USBM (Est.) - Estimated DOE

Add to this an excellent health and safety record for the coal mining industry in these Western States that is equal to or better than any other major mining operation in the nation. Overall, the industry is averaging about 1 fatality per 50 million tons of coal mined.

In other words, there should be no question about the progress and accomplishments achieved by industry.

The increased production can be directly attributed to the careful planning of industry operations and successful mining research. The companies now have equipment especially designed and built for Western coal operations:

* Draglines with 70-80 cubic yard buckets
* Haulage Trucks with over 100 ton capacity
* Crushers that can process 2500 tons per hour
* Continuous Belt Conveyors up to five feet wide that can move 4000 tons per hour, and
* Vibratory Feeders with capacities of up to 5000 tons per hour and the fastest coal trains in the West (Utah) that can load 11,000 tons per hour and send it on its way to markets a thousand miles away.

As of the end of last year there were approximately 13,000 employed directly in the coal mining industry in these seven States, and probably 10 times that many other jobs that have been created as the result of the coal production.

There should be no doubt in anyone's mind that the progress made by industry has been just a little short of miraculous. The real measure of the progress is that industry is keeping pace with market demand, at least for the time being.

Turning to the States themselves: You heard from the Governors of two Western States who summarized their concerns and progress. They have explained that the States are responding in good faith in order to be in compliance with Federal laws.

Here again, there can be no question about the progress that is being made from the states' point of view: the ground rules for coal development are being clarified, mined land reclamation techniques have advanced, our knowledge of the land and ground water conditions has been greatly expanded, levels of taxation are being tested, educational programs for coal mining and mined-land reclamation are being developed throughout the Junior College systems, and the opportunities for community health and social services are being expanded as rapidly as possible in the areas of greatest impact. Using the income and tax revenues from coal as indicators of progress in Wyoming, we can show an increase from $382,000 to $30,000,000 in eight years, as shown in Table 2.

TABLE 2

COAL INCOME AND TAXATION IN WYOMING

	1969	1977
Assessed valuation on production	$ 5,158,890	$182,641,777
Ad valorem tax	$ 278,203	$ 11,216,632
Severance tax	$ 51,592	$ 17,716,252
Sales and use tax	$ 53,000	$ 1,700,000
TOTAL	$ 382,795	$ 30,632,884

Within the Transportation and Marketing industries, progress has been equally impressive: new railroad rights of way have been acquired, planning and construction of new siding and arterial lines are underway, many hundreds of new coal cars have been built and are in use, and many are on order. Cooperative plans are being worked out with communities and states to minimize unit train interference with local automotive traffic.

Implementation of coal slurry pipelines is making slow but steady progress within the states as they seek out authority for eminent domain and rights of way, and as new plans emerge for even more distant markets.

If we are to judge from announcements concerning contracts between utility companies and coal mine operators, the market for Western coal has shown a steady increase in conjunction with both long and short term contracts, and higher prices per ton.

And then we might summarize progress on the part of the Federal Government's involvement with Western coal.

Since 1970 and the commencement of the leasing moratorium in 1971, the departments and agencies involved with Federal coal policies have been in a dilemma of trying to identify and paint "a yellow brick road". They got off to a bad start because of confusion

in the Executive and Congressional branches of government, and they are still being side-tracked by minor issues that lead apart from the primary objective of coal exploration and leasing. To date, hundreds of millions of dollars have been spent involving millions of man hours of effort without any substantial evidence of progress. Again, as in the Wizard of Oz, the Federal Government is finding that they have been searching for qualities and virtues that were readily available to them, but which they did not recognize.

Substantial progress has been made by the Federal Government in helping to develop educational and vocational programs related to health and safety and coal mining in the Western States through the Junior College and University systems. And, slowly but surely, some progress is being made to provide impact assistance for the States and the communities. But other than that, the confusion that these delays have caused State and county administrators and planners, and the cost to our communities and people, overshadow the so-called "progress" that has been made.

It is not for me to pass judgment and say that all of these delays could have been avoided because I am already tredding onto the subject of PROBLEMS.

So, in keeping with the objectives of this conference, let me conclude with these comments regarding PROGRESS.

1. We know the location and character of the coal resources and the division of land and mineral ownership in the Western States. Everyone seems to know these things except the personnel in the Federal agencies and the Congress who have never bothered to ask.
2. More than 95 percent of the extractable coal is under lands owned separately in fee by the state and by the Federal Government, and it is totally impractical for the Federal Government acting as it is to assume authority for development.
3. Historically, of all the lands held under coal leases, less than 1 percent have ever been developed or reached the mining stage. Under the present system of granting state and Federal mining permits, no development could move forward on any leases without approval by the appropriate regulatory agencies. There has been, and still is, a serious misconception in Washington that production of coal equates in some way with leasing; or that leasing is in some manner a function of production. There is no such relationship.
4. A standard Federal coal lease is a 3000-word paper document which when executed causes no environmental damage whatsoever. The issuance of leases on coal resource lands would not affect the environment one iota, but it would clear away the uncertainties and confusion that now plague industry and the planning efforts of the states. Leases could be issued that contain timetable provisions and stipulate compliance with appropriate OSM and state regulations regarding reclamation and other special environmental concerns. If this approach were employed and leases were issued, everyone would be in a more reasonable position to plan for the future and do their job in a more orderly and constructive manner.
5. In my opinion, it is time to identify the false "yellow brick roads" when we see them in the form of exaggerated concerns for prime farm land, alluvial valley

floors, reclamation to the original contour, multiple bed mining, and diligent performance, and call them delaying tactics purposefully designed to slow the procedure of supplying this nation with the low cost energy that will be needed during the next several decades.

6. The entire Western coal development program hinges on the competence and integrity of the Federal agencies involved.

There is one very great difference between the circumstances that surround Western coal and Dorothy's experiences in the Land of Oz. Dorothy eventually found her way to the wizard who helped transport her back to Kansas, and she awoke to find it had all been an exciting and scary dream.

Gentlemen, I can assure you that this is no dream. The nation must continue with the progress being made in Western coal development. Further Federal procrastination only serves to compound the problems for the future.

"Promises: Western Coal: The Best Is Yet To Come":
Carl E. Bagge, President, National Coal Association

Because of my assigned topic, "Promises", I fear that I'm expected to display some phychic powers and foretell the future of Western coal. But I want to be careful not to start singing the tune of our Federal Government these days - you know how that song goes: "Promises, Promises". Therefore, I have changed the title of my address and I would like to sing Sinatra's song: "The Best is Yet to Come".

It is difficult to separate the three topics covered this morning. They are closely intertwined. The problems could impede the progress and temper the promise. But the promise is real--and in my view the progress will overcome the problems.

I've been spending a lot of time in the West recently. The reason is not just the breathtaking beauty of this land, although my members suspect my purpose is to escape the frustrations of Washington. My visits are because coal activity in this part of the country is flourishing. In February of this year, five major energy companies in the West joined the ranks of coal producers and the Board of Directors of the National Coal Association. By 1985, those five new companies will be producing over 100 million tons annually. And last week, another Western company, one of the nation's largest contract miners, is now coming on board as an NCA member.

All these new NCA Board members from the West certainly provide promise for NCA's institutional future. But they also illustrate the promise of coal production and use in the West. Last month, I attended the opening of Kerr-McGee's Jacobs Ranch Mine; that mine alone will produce 12 million tons of coal in 1982. A few months ago, I attended the dedication of ARCO's Black Thunder Mine--a mine that will produce 20 million tons by 1983. I also participated in the recent dedication of Sunedco's Cordero Mine. That operation will be expanding to 24 million tons. The combined production of just Black Thunder and Cordero will equal the total production of the State of Wyoming last year. I'd say that's promise.

These mines provide part of the foundation for my enthusiasm over the promise of Western coal. Its future is bright.

While Western coal production is booming and will claim a much larger share

of the overall coal market than it does today, there are constraints on Western coal. Through the years, coal's constraints have primarily been ones of demand and politics. The demand end of the equation is changing dramatically! Now the principal constraint is the Federal Government.

The coal industry is caught in a unique dilemna. We have been offered a promise wrapped in a paradox. Coal has been declared the cornerstone of our nation's energy future, and we believe we can mine the coal to meet the needs of the country in the years ahead. The paradox lies in the growing package of legislation, regulations and government policies--which have been shaped to achieve laudable goals but which all restrain coal production and use.

You have been hearing plenty in the past few days--and just this morning--about the problems of Western coal, so I won't belabor them. But there are three constraints that I'd like to comment on in light of Western coal's promise.

One, of course, is last year's Surface Mining Act. The impact of that law is only beginning to be felt, since we are still in the initial regulatory phase.

But those interim regulations have already cost our producers enough headaches, money and time to make many of us very apprehensive about just what "surprises" the Office of Surface Mining has in store for us in the final batch of rules expected out soon.

NCA challenged the interim program in court, because it was quite clear to us that in many instances the regulations attempt to impose restrictive and expensive requirements which were never contemplated by the law. And in several cases, we believe OSM ignored Congress' clear intension that two successive programs be created--the interim one consisting of controls that could realistically be accomplished during the first couple of years, and then a permanent program incorporating broader controls that require more time to implement. Instead, several of those longer-range objectives were thrown into the same bag with the immediate goals, and industry has had to comply.

The court did grant us some relief on a number of important points in our lawsuit. It disagreed, however, with our contention that Congress did not intend for regulations dealing with certain specific issues such as prime farmlands and alluvial valley floors to be included in the interim program. Standards for alluvial valley floors, in particular, could have far-reaching impacts on coal development in the West.

Our industry is closely monitoring the permanent surface mining program now being developed by OSM, and will provide as much input as possible to that process. We have accepted the obligations imposed by the law because one of its stated purposes was to ensure that the coal supply essential to the nation's energy requirements is provided, and to strike a balance between environmental protection, agricultural productivity and coal production.

Unfortunately, we do not believe this balance has been struck by OSM, and as a result the scale is being tipped against crucial coal production. We certainly would have preferred to avoid a court confrontation, but we refused to sit idly by while our industry and ultimately the consumer got the short end of the deal.

The second crucial impediment to coal production in the West, as you know, is the Federal Government's nonexistent coal leasing program. The Department of the Interior's seven-year-old defacto moratorium on leasing publicly owned coal lands, coupled with the two or more years ahead before a new program is in place, makes a full decade that Federal coal reserves

will have been locked up. Even when leasing does resume, it will be several additional years before any of that coal is mined--when you consider the long lead times for reserve development, marketing, permitting and mine installation.

This Federal leasing question is one of the most important issues the coal industry faces as it enters the 1980's. It may well be the first step in the process of significantly increasing national coal production--the initial phase that renders all that follows either meaningful or moot. We can't be assured of our ability to mine Western coal if Federal leases aren't available where and when needed.

We're at a critical stage on this issue because Interior is now making some preliminary but fairly firm decisions on the shape of its new program. And some of those decisions are causing us some consternation.

The coal industry will continue to keep a watchful eye on the developing Federal leasing program and to work with government officials to devise a reasonable and above all workable approach to making sufficient leases available.

The third major governmental constraint is last year's Clean Air Act Amendments and the regulations to implement them. EPA's requirement of scrubbing for all new utility plants--despite the sulfur content of the coal used--obviously was intended in part to discourage Eastern utilities from going West for their fuel.

However, there are new projections on Eastern demand for Western coal that are worth taking a look at. A government-funded study done by ICF, a Washington consulting firm, minimizes the effect of clean air regulations on Western coal production. The latest computer runs show that scrubbing would shrink Eastern consumption of Western coal by only 14 million tons in 1990.

Regardless of the impact on Western coal traveling east, scrubbing is going to impose high costs on the utility industry and the consuming public in the West.

In spite of the problems, the sun is not setting on Western coal. I'm here to talk about the "promise" of Western coal--and promise there is. The progress may not be quite as quick as we would hope, but it will be steady and substantial. The basis for my optimism is the forecasting we've done at NCA indicating that of the one billion tons of coal expected to be produced in 1985, 40 percent will come from the West. That's impressive growth in Western coal's share of total U.S. production, considering that last year it accounted for 24 percent and was only 7 percent at the beginning of this decade.

There are plenty of skeptics who doubt that we can meet the 1 billion ton production goal. Granted--with our constraints, it won't be easy. But we have some encouraging evidence indicating it's within the realm of reality.

Last year, our output was 690 million tons. But this figure is an incomplete indicator, because our productive capacity has been expanding more rapidly than production itself in recent years. As an example, coal production levels last fall averaged 16 million tons per week. On an annual basis, production at this level would be 800 million tons.

In addition, a recent NCA study showed that the 100 firms that are expected to be the largest coal producers in 1985 plan to open or expand 332 mines--providing an additional 600 million tons of coal annually. Of this total new production, 66 percent will come from

Western mines. So, the industry should have the capacity to produce 1 billion tons in 1985.

But, that's not all. Recent Department of Energy data indicate that two-thirds of the coal required for new coal-fired units nationwide in 1986 is already under contract. In the West, 75 percent is already under contract for eight years down the road. It's apparent that utilities have not been waiting for Washington to decide that increased use of coal is a good idea.

Equally as impressive as the growth in coal production is the expansion of coal consumption--both nationwide and in the West. In our most up-to-date study on new generating units scheduled by year-end 1987, NCA has just found that utilities have planned to add 255 new coal-fired units--including 134 west of the Mississippi. When these units are on line, utility demand will exceed 850 million tons.

I want to emphasize that our studies have shown that the majority of the coal mined in the West will be used in the Western states to meet their need for energy. Western coal will fill the new power plant fuel requirements in states that historically have been dependent on natural gas and oil or hydro.

The most dramatic example of this trend is in the oil and gas states of the Southwest. One quarter of the new coal-fired capacity planned by utilities between now and 1987 will be built in Texas, Oklahoma, Arkansas and Louisiana. In Texas, 30 new coal-fired units will come on line in the next 10 years. Coal is also seeping into the Northwest, which has been supplied by cheap hydropower from Federal dams. And the mountain and Northern Great Plains states will supply their future energy with their own coal.

This massive influx of new coal-fired units is not the result of Federal legislation or government mandate. For the last five or six years, there has been a very strong movement in the utility industry away from the use of oil and gas and toward the use of more coal. This direction is the result of rational market forces.

Western coal has a very promising future as the feedstock for the infant synthetic fuels industry. If industry can get its financing together, along with some assurance that it can recover its investment under regulated prices, North Dakota will be the site of the first of a new generation of commercial-scale, coal-based synthetic gas plants.

So you can see why my industry has reason to be optimistic about its future. Our vision of coal's promise is clear--if we can overcome the government obstacles that potentially could cloud that vision. For some time, we have been urging the Federal Government to reexamine the many areas where its actions affect our ability to meet the nation's energy needs. Most of these issues involve the touchy subject of balancing our national objectives--that is, our energy, environmental and economic goals. None of these goals can be achieved in a vacuum. Therefore, we were encouraged by the establishment several months ago of three new interagency Federal coal task forces charged with identifying the roadblocks facing sharply increased coal production and use--and then taking actions necessary to remove them. One task force will be assessing the need to set up a tracking system for Federal permits needed for coal-fired power plants and coal mines. A second group will analyze the potential for increased coal use in the industrial sector. The final task force will be studying the impact of Federal leasing policies and regulatory factors on the feasibility of attaining the President's

coal production goals. I take some personal pride in the formation of these task forces. The action was in response to questions NCA raised to the administration earlier this year. The studies are progressing and we are looking forward to some output from them soon.

Another hopeful sign is the creation of the Presidential Commission on Coal, headed by Governor Rockefeller of West Virginia. This group has a massive task ahead of it. The commission will be examining new mining technology and the impact of Federal regulations on the industry. We are pleased that this group will be bringing attention at the highest levels to some of the coal industry's most pressing problems.

I am convinced that in the years ahead, coal can truly achieve its natural birthright as the principal energy source for America--with Western coal playing a significant and expanding role.

Finally, I'd like to comment on some matters that this Conference has impressed on me.

The National Energy Plan is not a "promise" for the coal industry. It contains no great new goal. Mandatory conversion of utilities from gas or oil to coal is opposed by the NCA, because it was unsuccessful for four years under the Federal Energy Administration. There were no conversions. If government forces a conversion to coal, then government must assure the coal supply and price-and this will be a very bad road to follow.

Governor Matheson and Herschler agreed that the hysteria between East and West is a red herring, although it has been the basis of controversy in Washington. Governor Matheson pointed out that the cost of scrubbers will impact Western consumers. The statements by these Governors should help to deescalate the East versus West controversy on coal.

I was impressed by Mr. Tom Throne, of the Powder River Basin Resources Council, in his speech at this Conference. His Council assumes the fact of development, and the issue to it is minimizing the adverse effect of such development. If this is the Western attitude, there is cause for optimism. This is a change from the hysteria of 1972, when the cry was to abolish surface mining. Thus, there is progress in the public perception of the need for coal.

A dialogue has been opened with the Department of the Interior, especially on coal leasing. Undersecretary of the Interior, James Joseph, and the Assistant Secretary for Land and Water, Guy Martin, made DOI's commitment to this dialogue with industry.

The ultimate promise of Western coal is the experience I've had with the people here: this is the commitment of dedicated people in the technical field of producing and utilizing coal.

We must face the challenge of whether we can sensibly use our vast coal resources, whether the general public concept of the national welfare can be made widespread enough that the sensible use of this enormous reservoir of energy is a worthwhile and indeed a critical national objective.

You know and I know that we can develop our nation's coal resources carefully and responsibly, without outraging man or nature. But our first task is to convince our lawmakers, our regulators and our fellow citizens that we can do so. For this we need promises and more. We need to demonstrate this ability, insofar as we are allowed to. We need both persuasion and performance. And we can achieve them, for we must.

"The Real Energy Crisis":
Hollis Dole, Atlantic Richfield Company

We're now at the end of a five-day session devoted to the problems, progress, and promises of Western coal, and I'm going to assume that everything worthwhile saying about that subject has already been said. In any event, I know that there is nothing about Western coal that I can add to the last forty hours of discussions, so in these closing minutes I'm not going to talk about coal at all, but about the general subject of energy. You've heard plenty about that too, but you haven't had the total immersion treatment over the past five days that you've just gone through with coal. So, like innumerable speakers before me at different places and different times around the country, I'm going to talk about the so-called Energy Crisis. I plan to do it without using any pictures or forecasts or numbers because I'm going to pass by the conventional treatment of the subject which is to compare estimated future demand with future supply and calculate the resulting shortage.

Instead, I'm going to talk about what I regard as the real energy crisis, which is our inability to get our act together with enough consistency of purpose to do the things that must be done to develop the enormous energy resources that we have right here under our very feet. We've been on dead center, just about, since we first began to recognize we had a problem with energy almost ten years ago. Even the Arab embargo failed to shock us into a concerted, sustained program of action. In fact, about all it did was to confuse us, and we're far worse off today than we were in 1973. Last year, nearly one barrel of oil out of every two we used came from a foreign source.

We suffer this paralysis of will because a gross distortion has occurred in the economic processes by which energy is produced and distributed. I specifically refer to the massive intrusion by governments at all levels into the province that naturally and historically has belonged to private companies and individuals, and you will immediately recognize that this phenomenon is not confined to the energy industries. It reaches into every home and office in the country, and extends to nearly every human activity--as anybody who has ever tried to open a child-proof, adult-proof, wrench-proof, hammer-proof bottle of aspirin can attest.

I'm not here to bemoan the passing of the Good Old Free Enterprise system. Enterprise in this country-or any other country-has never been free of government regulation, nor has it ever wanted to be. The record of protective tariffs, fair trade laws, market demand proration, oil import controls, and other innumerable restraints on trade demanded by self-styled Free Enterprises amply demonstrated that nobody really takes Adam Smith at his word. We've always been a regulated economy, with the responsibility of government ideally being to create favorable climate and provide the playing rules under which those in the private sector would be encouraged to accummulate and risk their capital to produce the goods and services demanded by people in ways that would confer the most benefit and inflict the least damage on society.

That's the ideal, but human relations are far from ideal. The truth is that business and government have always existed in a state of mutual antagonism. That isn't necessarily bad. In fact, it's quite good. That adversary relationship, comparable in many respects to that between the press and government, has sparked our economic progress. The relationship even survived the Great Depression and World War II relatively intact. Today, however, ironically in the greatest era of growth and prosperity the nation has ever experienced, the

creative tension that has existed between government and business is being subjected to an extraordinary and, in my judgment, potentially destructive strain. The problem of course is the unbridled growth of government.

In fact, I suspect it was that very prosperity and growth that supplied the impetus to the transmogrified role of government because it created the economic surplus that was available to fund all the wonderful new things that governments from Capitol Hill to City Hall eventually got themselves involved in. We had only limited government involvement before this period mainly because limited government involvement was all we could afford. Those of you who remember the Depression of the Thirties will remember how straitened the ordinary family was during that period, and if some of you are old enough to remember the so-called "boom times" of the Twenties you will also recall that things weren't all that great even then.

The point is that while Americans have always entertained the notion that their society was infinitely perfectible the overwhelming concern of most families down to the end of World War II was just the plain and simple business of making it from one precarious year to the next, and perfectibility would have to wait on these much more urgent personal concerns. Then, within the span of a single generation, real income doubled and suddenly the infinitely perfectible society seemed to become a realistic possibility--or so we thought. So we declared War on Poverty and set out to rebuild the cities, to restore the environment, to broaden and enrich the educational system, to cushion the impact of catastrophic illness, and to protect producers and consumers alike from the slings and arrows of both outrageous fortune and outrageous fortune hunters.

These are large causes, and to move them along we created organs of government whose sole purpose was to advance them as rapidly and as grandly as possible with the new stream of tax revenue that our new-found prosperity made available. And these new entities, staffed by dedicated idealists and goaded by the constituencies that had been instrumental in their creation, turned to their assigned tasks with all the fiery zeal of a missionary on his first calling. Their numbers multiplied; so did the funds appropriated to them; so did the reach of their activities; and so, inevitably did their involvement in affairs that had formerly been left to the private sector.

In short, these evangelists of perfection set out to create a society that would be free of want, free of pollution, free of urban blight, free of inequity, and free of risk to its citizens, ignoring the fact that the price for the attainment of these absolute goals is freedom itself. For a free society is inevitably a society of risk, a society of inequity, a society where departures from "ideal" behavior and circumstance at times border on the grotesque--made so by the very exercise of freedom by individuals who are equal as political entities but in no other respect.

Be that as it may, this is the social and political context in which private enterprise, including the energy industries, must now function. For the natural gas industry, interference from the Federal Government started as early as 1961 when the Federal Power Commission finally came to grips with its 1954 count-mandated responsibility to set wellhead ceiling prices on natural gas moving in interstate commerce. A rational response to this

assignment would have been impossible even if the Commission had not been subjected to the relentless pressure of consumers who outnumbered producers several thousand to one. Nevertheless the wisdom of bureaucrats was substituted for the wisdom of the marketplace, the results are the clearest kind of evidence for the old adage that you get only what you pay for, and if you don't pay enough, you don't get enough. Consumers enjoyed several years of cheap gas while exploration and discoveries fell off, reserves declined, and at last a shortage appeared because producers found better uses for their money than looking for the gas they couldn't sell for enough to cover their costs.

And while the Federal Power Commission was busy protecting the consumer into a gas shortage, it produced other impacts on the energy economy. The artifically low price of gas demoralized the coal market for years before anybody had ever heard of air quality standards, and trillions of cubic feet where burned under boilers that might now be available for householders. Any serious effort to perfect a process for making gas out of coal was buried, and we are now trying to buy back that lost time at a rate of hundreds of millions of dollars a year.

That's the bad news about gas. The good news is that even in the midst of a national shortage of gas there is plenty of gas available in the intra-state markets of Texas, Oklahoma and Louisiana where the price is set by the market uninstructed by the Supreme Court's decision about interstate gas prices. It's not the cheap controlled gas -- pipelines have paid as much as $2.00 a thousand and more for it -- but the people have gas down there, and at the prices they pay they use it very carefully -- so carefully that there is presently a market surplus in those states just as there is on the West Coast which can have all the gas it wants from Canada at around $2.00 per MCF. That's conservation at the pocketbook level, and it's very effective.

Oil followed gas down the tube in 1971 when price controls were imposed on everything in the hope of stemming an inflation rate that had reached a hair-curling 4½ percent. (Oh, how I wish it was only that today.) The effect was disastrous. With all prices locked down to their levels of August 15, 1971, market distortions soon began to appear, followed by shortage of various products in various parts of the country, and the injured parties, being the good Free Enterprises that they were, went screaming to the Federal Government for relief. So to quiet the petitioners and hopefully to mitigate some of the damage it had done through its price controls, the Government undertook to allocate petroleum supplies so that everybody in the business would be kept whole on the basis of his share in the market as of a specified base period. Thus, even before the upheaval in world oil markets caused by the Arab cutbacks and embargo in 1973, the United States Government was controlling every basic operating decision the oil companies made: whom to buy from; whom to sell to; how much could be sold and at what price; how much of each product to make; and what inventory levels to carry, and where.

These are all problems that used to be solved so quietly and efficiently in the everyday transactions between buyers and sellers in the marketplace that the consuming public was never even aware of them. Now they have to be solved by government clerks sitting in judgment at adversary proceedings, trying to work within an elaborate framework of rules

that are inherently disposed to kill competition, stifle initiative, and which lock every entity in the oil business into a status quo that assesses no penalties for failure and grants no rewards for success.

When the dust finally settled over the latest Arab-Israeli imbroglio in early 1974, the price controllers at home surveyed the scene and decided that just because oil sold for $10.00 a barrel on the world market, it was all the more reason to make sure it couldn't happen here. The result of their labors was the present oil entitlements programs which attempts to deal with the fact that refiners have to pay three different government-mandated prices for oil: a controlled low price for oil that had already been discovered and developed; a higher controlled price for oil discovered after a certain date; and the world market price for foreign oil. The essence of the entitlements program, stripped of all its loopholes and gimmicks, is to assure that every refiner pays the same average price for the crude oil he runs in his refinery, regardless of its source or whether it's his own oil or somebody else's.

To make this system work requires a tremendous balancing act every month, with refiners with access to large amounts of "old" domestic oil, controlled at a low price, sending money to other refiners who have to rely mainly on high-priced foreign and newly discovered domestic oil. The exchange of money runs to billions of dollars a month, and the two chief effects of the program have been to encourage the consumption of more oil than ever, because of the subsidized price, and to encourage the importation of more oil than ever, because it is to every refiner's benefit to import as much oil as he can. The refiner who has access to large amounts of low-priced domestic oil can reduce his entitlements payments to other refiners by using a larger portion of high-priced foreign oil in his own plants. But the refiner who has to rely mainly on foreign oil can increase the payments he gets from other refiners by the same means -- his monthly entitlements check gets bigger with every extra barrel of foreign oil that he can manage to buy. The result of this incentive to refiners to import as much oil as possible has been to discourage the development of marginal oil supplies here at home.

So the entitlements program subsidizes the export of dollars and jobs and the import of $14.00 a barrel crude oil while encouraging unnecessary consumption and resulting in shut-in production, particularly in California. It is a classic case of the truth that one thing leads to another. Price controls lead to shortages which lead to supply controls.

And it leads to something else, too. When I was with the Department of the Interior there were not more than 15 people connected with the regulation of oil -- the old Oil Import Administration and the Oil Import Appeals Board. Today there are 1500 people in the Department of Energy trying to manage oil prices, allocations and entitlements -- a hundred-fold increase in less than six years. Secretary Schlesinger has indicated that he hopes to declare these people surplus if Congress gives him his Crude Oil Equalization Tax, but I wonder if it is going to be that simple. Especially with an additional $10 billion a year flowing into the Treasury virtually demanding to be spent for some worthy cause or other. And with that kind of money up for grabs, worthiness can be pursued with vigor. Old bureaus never die, and even worse, they don't even fade away. They just reorganize.

I have drawn these two examples of oil and gas regulation from my own experience to show how the intrusion of the Federal Government in the marketplace for energy has undermined the very objectives it sought to achieve. Other intrusions, with other objectives in mind, have had equally damaging impacts upon domestic energy development. In particular the laws aimed at environmental protection, worker health and safety, the preservation of endangered species, the reservation of wilderness areas, the protection of archeological deposits, the restoration of the nation's streams and rivers and airsheds to acceptable standards of purity all have direct effects upon domestic energy production and use.

No one I know has ever raised any objection to any of these commendable goals; it is just that we seem unable to go about achieving them without shooting ourselves in the foot. The laws are ill conceived and badly written; the regulations placing them into effect are monstrosities of obfuscation and impertinence; those who enforce them are ill-prepared and unfamiliar with the operations and processes they are commissioned to supervise. There is an excessive layering and overlapping of functions among supervisory agencies from the Federal Government through state, county and municipal levels, and turf fights abound in both vertical and horizontal dimensions that have all but paralyzed the granting of permits and licenses. Worst of all has been the growing tendency to involve the courts in matters they are singularly ill-equipped to deal with and which has thrown the established relationships among executive agencies, the courts, the Congress and the parties at interest in a dispute into utter disarray. This has enormously enhanced the strategic position of the stop-everything zealots whose real cause is not environmental protection, but the Zero-Growth Society. In a climate of double digit inflation a "temporary" injunction that lasts five years while the litigation proceeds is often equivalent to victory for those who bring the suit even if the defendant eventually wins the case. All that may be required to stop a project of major national significance is one judge and one plaintiff -- often residing thousands of miles away from the physical site of the controversy.

Under these conditions a three-inch fish becomes more important than a hundred million dollar dam and the thousands of people it would have served. A 3000 megawatt coal-burning electric plant is finally abandoned by its sponsors after 13 years of hassling by regulatory agencies and non-resident groups professing to see in it a threat to the environment. A pipeline that would save 2 million barrels a day of oil imports and $10 billion a year in our trade balance can be held up four years to the point where literally an Act of Congress is required for its rescue. Scrubbers are mandated for power plants that burn Wyoming coal which is as clean without scrubbers as Illinois coal is with scrubbers -- a further reminder that not all the Giant Pandas in the country are to be found in the Washington Zoo. A $700 million hydroelectric project must give way to 30 specimens of a plant undistinguished for anything except the name of furbish lousewort. Development -- including energy development -- is inhibited in nonattainment areas because the air is too dirty, and prohibited in nondegradation areas because the air is too clean -- according to government-prescribed standards. Meanwhile, vast regions that one would think would be classified as <u>nondegradation</u> attainment areas because they are virtually uninhabited turn out in fact to be <u>nonattainment</u> areas because their natural background levels of dust, ozone, and hydrocarbon emissions from

vegetation exceed government standards. Not even Mother Nature herself can satisfy the exacting requirements of the state and Federal bureaucracies!

This is not environmental policy or energy policy or any other kind of policy. It is lunacy. But it is also fact. It is the product of the single-minded pursuit of single objectives by single-purpose organizations without regard for the larger consequences of their actions. And those larger consequences include substantial contributions to inflation, declining productivity, unemployment, oil imports, the deficit in our balance of payments, and the multiplying troubles of the dollar. We have it today because those in government -- and industry too -- allowed themselves to be intimidated and manipulated by splinter groups of self-appointed guardians of the public interest who claim to speak for the people of the United States. And it will endure until the real vox populi is heard loud and clear from Honolulu and Anchorage to New York and Miami and Washington.

Now, of course, maybe I'm hearing things that aren't there, but the sounds I hear and the things I see encourage me to think that the people of the United States are beginning to speak up at long last. A few weeks ago in Boise, Idaho, I took some small pleasure in witnessing the discomforture of the Director of the Bureau of Land Management who had been sent out to placate an assemblage of Western ranchers. His peace offering was the promise to spend a billion dollars to upgrade the range. The ranchers weren't impressed, and some were frank enough to say that they figured that billion dollars had some strings to it and they weren't interested in going along with his game. A few weeks later, a convoy of truckers rolled into Washington to demand relief from the detailed regulations that were driving them up the wall and out of business -- and some were pretty blunt about their sentiments. Newsweek of August 14 carried a story of citizens uniting to resist being put out of their homes in areas being taken over by the National Park Service. Proposition 13 and the dozens of similar movements it has inspired throughout the country are a revolt not only against high taxes, but against intrusive and meddlesome government. President Carter won an election two years ago on a platform which had a plank to give the people some relief from the oppression of Federal bureaucrats and one of the reasons he is in trouble now is his failure to deliver on that pledge. The Senate even found it safe to vote down Ralph Nader's special pet earlier this year -- the so-called Consumer Protection Agency.

But these are only straws in the wind, and we have a long, long way to go to redress the balance between government and the private sector. The effort needs all the help we can give it, and I would hope that all of you will give it your active support. We don't have a lot of time left, either. It is only six more years to 1984.

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